EL-SHARNOBY PEDIATRICS MADE EASY

Collection of pediatrics lectures

OF DR. SAMEH EL-SHARNOBY

CONSULTANT OF PEDIATRICS
EL-MINSHAWY HOSPITAL

EDITED BY: DR/ SHALABY

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Antipyretics

Antipyretics

paracetamol	**10-15mg/kg/dose Every 6-8 hours**	**<u>Drops</u>….** **Cetal ,pyral ,tempra** **1-2 drop/kg/dose every 6-8 H** **<u>Syrup</u>….** **-Most preparations contain** **100-160mg/5ml** **e.g tempra, abimol, paramol, pyremol** **-*dose*= 5ml/10kg/dose every 6-8 hours** **<u>exception</u>** **cetal syrup 250mg/5ml(wt/5 per dose)** **temporal syrup250mg/5ml(wt/5per dose)** **fevano syrup200mg/5ml (wt/4 per dose)** **<u>supp</u>…** **-most preparations contain** **100-160mg/supp** **-e.g cetal, paramol, paralex supp** **-*dose*=1 supp/10mg/dose every 6-8 H** **<u>exception</u>** **Abimol, supp 300mg/supp** **pyral supp 250mg/supp** **Grippo supp 200mg/supp**	-**Most safe** analgesic Antipyretic -can be used from **1st Day of life** -safe in asthmatics -its **not** antiinflammatory
Ibuprofen	**10-15mg/kg/dose Every 6-8 hours**	**<u>Drops</u>…** **Flabu 40mg/ml** **<u>Syrup</u>…** **Brufen, ultrafen 100mg/5ml** **Dose=wt/2 every 6-8 hours** **<u>Supp</u>…** **Marcofen supp 100 &300 mg/supp** **Ultrafen supp 200 &5oo mg/supp** **<u>Tab</u> …** **Brufen , ultrafen 200, 400, 600 mg/tab**	-safe **from 6 months** ongoing

Declophenac	**,5-1 mg/kg/dose With maximum 3,5 mg/kg/day**	**<u>Drops</u>…** **Dolphin k, cataflam 1-2drop/kg/dose** **<u>Syrup</u>…** **Catafly** **<u>Supp</u>…** **Dolphin,Babyrelief,voltaren,Epifenac (Na) 12,5 &25 mg/supp** **Adwiflam(K) 25 mg/supp** **(< 3years use 12.5mg supp / 8 hour)** **<u>Injection</u>…** **Declophen amp 75mg/3ml** **Dose=1 cm / 20-25kg**	-Safe **after 1 year** only -not allowed in asthmatic (drug induced bronchopasm)
Acetylsalicylic acid	**10-15mg/kg/dose**	**-<u>Tab</u>…** **Roanal 500mg/tab** **Alexoprine 300mg/tab** **-<u>Injection</u>….** **Aspegic 500mg/vial** **Dose= 1cm / 10kg per dose IV** **-<u>Supp</u>…** **Vegaskine supp** **Doloran supp**	Absolutely **Contraindicated** with Viral infections for fear Of Rey's $(see below)
Mefenamic Acid		**Ponstan <u>susp</u> 50mg/5ml** **Ponstan, mefentan cap 250 mg/U**	**Safe in G6PD↓**
Nimsulide		**Withdrawn from market**	
metimazol		**are obsulted in pedaitrics**	

N.B1 Antipyretics do not act in presence of high fever so lowering of body tempreture By tiped spongs (الكمادات) must be done first

N.B 2 **REYE'S $**

syndrome is characterized by acute encephalopathy and fatty degeneration of the live

-<u>SYMPTOMS AT TIME OF ADMISSION</u>:

1.Usually quiet, lethargic and sleepy, vomiting, laboratory evidence of liver dysfunction
2.Deep lethargy, confusion, delirium, combative, hyperventilation, hyper-reflexic
3.Obtunded, light coma ± seizures, decorticate rigidity, intact pupillary light reaction
4.Seizures, deepening coma, decerebrate rigidity, loss of oculocephalic reflexes, fixed pupils
5.Coma, loss of deep tendon reflexes, respiratory arrest, fixed dilated pupils, flaccidity/decerebrate (intermittent); isoelectric electroencephalogram

-<u>Diagnosis</u>:

-There is explosive release from liver and muscle of such enzymes as aminotransferases, creatine kinase, and lactic dehydrogenasea

-threefold or higher elevation in serum ammonia level are more likely to progress to com

-<u>treatment</u>:

-mainly supportive

N.B3

Choice of antipyretics by age group

< 6 months…………..paracetamol
6months-1year………paracetamol &ibuprofen
>1 year………………paracetamol , ibuprofen &declophenac

N.B 4 The best manner to use antipyretics is :

To use two drugs of two different groups(paracetamol+ either ibuprofen declophenac) alternatively

How ?

paracetamol→after 4 hours→ibuprofen→after 4 H→paracetamol→ after 4 H→ ibuprofen and so on

-بالتبادل كل اربع ساعات

Antibiotics

Antibiotics

Pencillins

A-natural pencillin **1-benzyl pencillin**	50.000-100.000 unit/kg/ day Iv or im Every 6 hours (in neonates every 12 h) Unstable once dissolved Must be administrated	Pencillin G vial 1.000.000u **Aqua-pen vial** 1.000.000 u	-Mainly Gram +ve But not antistaph **-no need for sensitivity Test**
2-phenoxy methyl pencillin	50.000-100.000 unit/kg/ day orrally every 6-8hours	**Ospen** →susp 400.000 unit/5ml →tab 1.000.000 unit/tab Cliacil →susp 300.000 unit/5ml →tab 1.000.000 unit/tab	For prophylaxis in RF Its given every 12 hour
3-benzathine pencillin	< 27 kg →1/2 vial > 27 kg→1 vial Or < 3 years→1/4 vial 3-6 year→1/2 vial >6 years→1 vial **I M** every 2 weeks	Depopen vial--1.200.000unit Lastipen vial--1.200.000unit	Mainly used in prophylaxis of **RF** Every **2 weeks** **-sensitivity test must be Done** before **each** injection -can be dissolved in **Lidocaine**
4-procaine pencillin	< 4 years→ 1 vial > 4 years→ 2 vials Every day as asingle dose Or in 2 divided doses For 7 days	Pencillin procaine vial 400.000 unit /vial	-Mainly used in **Strept pharyngitis** -sensitivity test must be Done before start of every **Course** of ttt **only**

B-broad spectrum pencillins			Gram +ve→but **not**antistaph Gram-ve→but **Not** Antipseudomonas **Not** Antiklebiella
Ampicillin	60-90mg/kg/day every 6-8 h (20-30mg/kg/dose) In meningitis→ **150-200** mg/kg/ Day	-Epicocillin Ampicillin susp→125-250mg/5ml vial→500-1000mg/vial	Main side effects are : -diarrhea -skin rash e Infectious Mononucleosis
Ampicillin+ sulbactam	**oral**→50 mg/kg/day i.e 1 cm/kg/day every 8 H **parenyral**→150mg/kg/day	unasyn,**unictam**,ampictam susp 250 mg/ 5ml -**unasyn**,unictam,sulbin vial 375,750,1500,3000 mg / vial	
Amoxicillin	60-90 mg /kg /day every 8 h (20-30mg/kg/dose) Oral, iv, im	-**Drops** hiconcil 100mg/ml -**Susp** Biomox 125-250 mg/ 5ml **Ibiamox 200-400mg**/5ml -**Vials** e-mox 250-500-1gm/vial	**Less** side effects than Ampicillin
Amoxicillin +Clavulinic acid	60-90 mg/kg/day (20-30mg/kg/dose) Orally every 8 h 30 mg/kg/day **Iv only** every 12 h	-**Hibiotic**-N susp 230 – 460 mg/5ml -Megamox,deltaclave susp 228.5– 457 mg/5ml -Augmentin , curam susp 156–312 mg/5ml -Augmintin ,magnabiotic 600 mg &1,2gm vial	Contraindicated before **9** Months old d.t GIT troubles
C-Pencillin Combinations	100-**200** mg/kg/day	-Amox+flucloxacillin e.g **flumox** susp 250 vial 500mg &1gm cap 250 ,500 mg -amox+cloxacillin - amox+dicloxacillin	Oral preparation has bad tast njection form very painful

D-<u>other pencillins</u> **piperacillin** **pencillinase resistant pencillin**	200-300mg/kg/day 8-12h Im or iv Cloxacillin Dicolxacillin Flucloxacillin	pipril vial 2gm & 4gm	Same spectrum as ampicillin **+antipseudomonas**

Cephalosporines

<u>A-first generation</u> 1-cephradine	60-90 mg/kg/day every **6-8 H** (20-30mg/kg/dose) Oral ,iv, im	Ceporex , ospexin ,keflex Susp ….125 &250 mg /5ml Ceporex tab 250 ,500 ,1000 mg Ceporex vial 500 , 1000 mg	**80% Gram +ve** **20% Grame –ve**
2-cephradine	60-90 mg/kg/day every **8 H** (20-30mg/kg/dose) Oral ,iv, im	Velosef ,cephradine ,cefadrine Susp…125 &250 mg /5ml Cap…250 ,500 ,1000 mg Vial…250 ,500 ,1000 mg Farcocef vial only 250&500mg	

3-cephadroxil	50 mg /kg /day every **12 H** Orally -In case of susp 250 Dose=wt/2 every 12h -In case of susp 250 Dose=wt every 12 h	Duricef , biodroxil Susp…125 ,250 ,**500** mg/5ml cap….500mg N.B…curisafe drops 100mg/ml	

<u>B-second generation</u> **1-Cefruxime**	Oral →20-40mg/kg/day Every 12 H parentral→50-100mg/kg/day every 12 H IV or IM	Zinnat - Susp…..250mg/5ml - Vial….750 &1500mg	**50% Gram +ve 50% Gram -ve**
2-Cefaclor	20-40mg /kg/day every 8 H **(10 mg/kg/dose**) orally In case of **250mg susp** **Dose=wt/5 every** 8 H	**Bacticlor →60 ml** -susp…125 &250mg/5ml ceclor→**75 ml** -125&250mg/5ml	
3-Cefprozil	20-40mg/kg/day every 8H	Cefzil susp 125&250mg/5ml	

C-third generation **ceftriaxone**	50-75 mg/kg/day **single daily dose** **Iv→with water** **IM→with lidocaine** **Available in to forms one for IM injection& the other for IV injection**	**Cefaxone vials** **250……8 جنيه** **500……14 جنيه** **1000…..20 جنيه** **Oframax vials** **250….8 جنيه** **500….22 جنيه** **Ceftriaxone sandoz** **250…..9 جنيه** **5000….18 جنيه** **1000….29 جنيه**	**80% Gram –ve** **20% Gram +ve** **&antipseudomonal** Active agaist gram+ve& Gram –ve but **not** Antipeudomonal
cefotaxime	**100-150mg/kg/day every 12 H** **IV oR IM**	**Xorine vial ½ &1gm** **Cefotax , claforan vial 1/4 , 1/2 & 1 gm**	
cefoperazone	100-150mg/kg/day every 12 H IV oR IM	Cefobid & cefazone vial 1/2gm & 1 gm	Limited use in pediatrics →affect spermatogenesis&can Cause **testicular atrophy**
ceftazidime	100-150mg/kg/day every 12H IV oR IM	**Fortum** vial 1/4 , 1/2 & 1gm	Most potent against pseudomonas

oral 3rd generation cefixime	8 mg/kg/day single dose or **in 2 divided doses** √√	**Ximacef** &suprax Susp 100mg/5ml cap 200mg/cap	**Not** antistaph **Not** antipseudomonal Used **mainly** in ttt of Uti , typhoid fever, OM& sinusitis
cefpodoxime	1o mg/kg/day in 2 divided doses	**Orelox** susp 40mg/5ml Tab 100mg	
D-fourth generation 1-cefpime	50-100mg/kg/day 1n 2divided dose	Wincef vial.. 1/2 gm(14) 1gm(21)	More extended spectrum than 3rd gen
2-cefepime	50-100mg/kg/day 1n 2divided dose	Maxipime 1/2&1 gm Cefrom 1/2&1 gm vials	
aminoglcosides **gentamicin**	5-7 mg/kg/day 1n **2-3** divided Doses IV oR IM	-Garamycin amp 20 & 80 mg/**2ml** 40 mg/**ml** -Epigent amp 20 & 80 mg /**2 ml** -gentamycin amp 20 & 80 mg/**2ml** 40 mg/**ml**	**mainly Gram-ve →** **+ Antipseudomonal** **+ Weak Anti staph** Most nephrotoxic(**reversible**) **Especially**: -When taken e other nephrotoxic Drugs -in renal patient

amikacin	10-15mg/kg/day 1n **2** divided Doses IV oR IM	**Amikin vial** 100 , 250 ,500 mg/**2ml**	Widest spectrum Most ototoxic(**irreversible**) Both auditory&vestibular
tobramycin	**2.5-7.5mg**/kg/day in **2-3** divided Doses IV oR IM	**Nebcin vial** 20 &80 mg/**2ml**	**Most active against pseudomonas**

N.B

1-amnoglycosides should not be used more than one week otherwise evaluation of renal function Must be carried out

2- amnoglycosides not used in ttt of meningitis as it do not cross blood brain barrier

3-no oral form as no absorption from GIT

macrolides

Erythromycin	**30-50mg/kg/d Every 6-8 H Orally**	**-Erythrin & erythrocin Susp… 200mg / 5ml -Eryped susp 400mg/5ml N.B→present in some combination e.g pedizole susp (+ SMX 600mg) primomycin susp(+ TMP 50mg)**	**Gram+ve mainly Active against atypical Organisms(no cell wall) e.g mycoplasma, Chlamydia campylobacter**
Clarithromycin	**15mg/kg/day Every 12 H Orally After meal**	**Klacid susp..125 &250mg/5ml Klarimix susp…125mg/5ml**	

Azithromycim	**10mg/kg/day** **Every 24 H** **Orally** **On empty Stamch**	**Zisrocin susp (30ml) …100mg/5m** **Xithrone susp(15ml). 200mg/5ml** **Zithrodose(45ml)..100mg/5ml** **In case of 100mg susp** **Dose = wt / 2 per day** **In case of 200mg susp** **Dose= wt / 4 per day**	Although ttt **for 3 days** only it Remain in tissue in effective Concentration **for 10 days**
Spiramycin **Roxithromycin**			

0ther antibiotics

t\Tetracycline	25–50 mg/kg/day in 2–4 divided doses.	**Vibramycin** **Doxy SR** **Cap...100mg/cap**	-**Contraindicated** before **8 years** old -Mainly in….. brucella, Chlamydia &Mycoplasma infection N.B----may be used in Sinusitis (**ambrodoxy cap**)
chloramphenicol	50-100mg/kg/day Oral IV IM Every 8 H	**Mephenicol** **Cidocetine** **Vial--1gm** **Susp--125mg** **Supp--125&250**	-**Contraindicated** before **6 years** old (bone marrow depression) -Mainly in….. Meningitis Typhoid fever
sulphamethoxazole Trimethoprim	**4mg tmp+20mgsmx/kg/day** **In 2 divided doses** In susp form--- 1cm/kg/day every 12h	**Septrin, Septazol & Sutrim susp** **(200mgsmx+ 40mgTmp)**	Mainly in….. -UTI -GE
clindamycin	20-40my/kg/day Every 8-12 h Oral IV IM	**-Dalacin c** **Amp…150,300,600** **Cap... 150 , 300 mg** **-Clindam** **Cap…150 , 300mg**	Mainly in **anaerobic** infection &antistaph (e.g dental infections)
Quinolone	-**Ciprofloxacin** **In neonates ??** 10mg/kg/day **Infant&children** 15-30mg/kg/day - **Ofloxacin** completely **Contraindicated** in In pediatrics		**Not** recommended before **16** years **N.B---**topical preparations are **safe** In all ages

Nitrofurantoin :

Dose----5-7mg/kg/day rvery 12 H after meals (food↑ its absorption by 40%)

Preparations------uvamin retard cap 100mg/cap

macrofuran&mepafuran cap 50 &100mg/cap

N.B- 1-mainly in uti

2-In long term use(uti prophylaxis) may cause peripheral neuritis so Consider Vit B compl

3-Like other nitrofuran(nifruxazide(antinal)&furazolidon) is contraindicated in favism

Choice of antibiotic by system

- URTI

-amoxycillin , amoxicillin clavulinic acid ,ampicillin sulbactam

- 1^{st} generation cephalosporin

-2^{nd} generation cephalosporin

-LOWER RESPIRATORY TRACT INFECTION

-3^{rd} generation cephalosporin

-2^{nd} generation cephalosporin

- Amoxicillin clavulinic acid

-GIT INFECTIONS(GE)…………………………….only with:

- SMX-TMP	patient looks toxic
-CEFTRIAXONE	salmonella,shigella,campylobacter
-CEFOTAXIME	patient in shock(no time to wait)
-XIMACEF	parentral GE

-UTI

-Nitrofurantoin

-SMX-TMP

-3^{rd} generation cephalosporin

-1^{st} generation cephalosporin(cephadroxil)

-Aminoglycosides

-SKIN INFECTION

-Macrolides -2^{nd} generation cephalosporin -3^{rd} generation cephalosporin

-OSTEOMYLITIS

-antistaph e.g Cloxacillin , Flucloxacillin(Flumox 200mg/kg/day)

or Vancomycin(Vancocin 40-80mg/kg/day)

+ Fortum ,Ceftriaxone or Cefotaxime

ANTIBIOTIC SELECTION BY AGE GROUPS

1-Amox-clav…………contraindicated before **9** months(GIT troubles)
2-Chloramphenicol…. contraindicated before **5** years(bone marrow depression)
3-Tetracyclin…………contraindicated before **8** years
4-Ofloxacin………… contraindicated before **12** years(osteoarthropathy)

How to calculate dose of antibiotic?

In suspension form

- Required Dose in ml =

<u>amount required in mg/kg/dose × body weight × 5(spoon)</u>
Concentration of susp(125 or 250 …. etc)

الكميه المطلوبه فى الجرعه ب سم = <u>الكميه المطلوبه فى الجرعه بالمجم×الوز × 5</u>
التركيز(125 او 250)

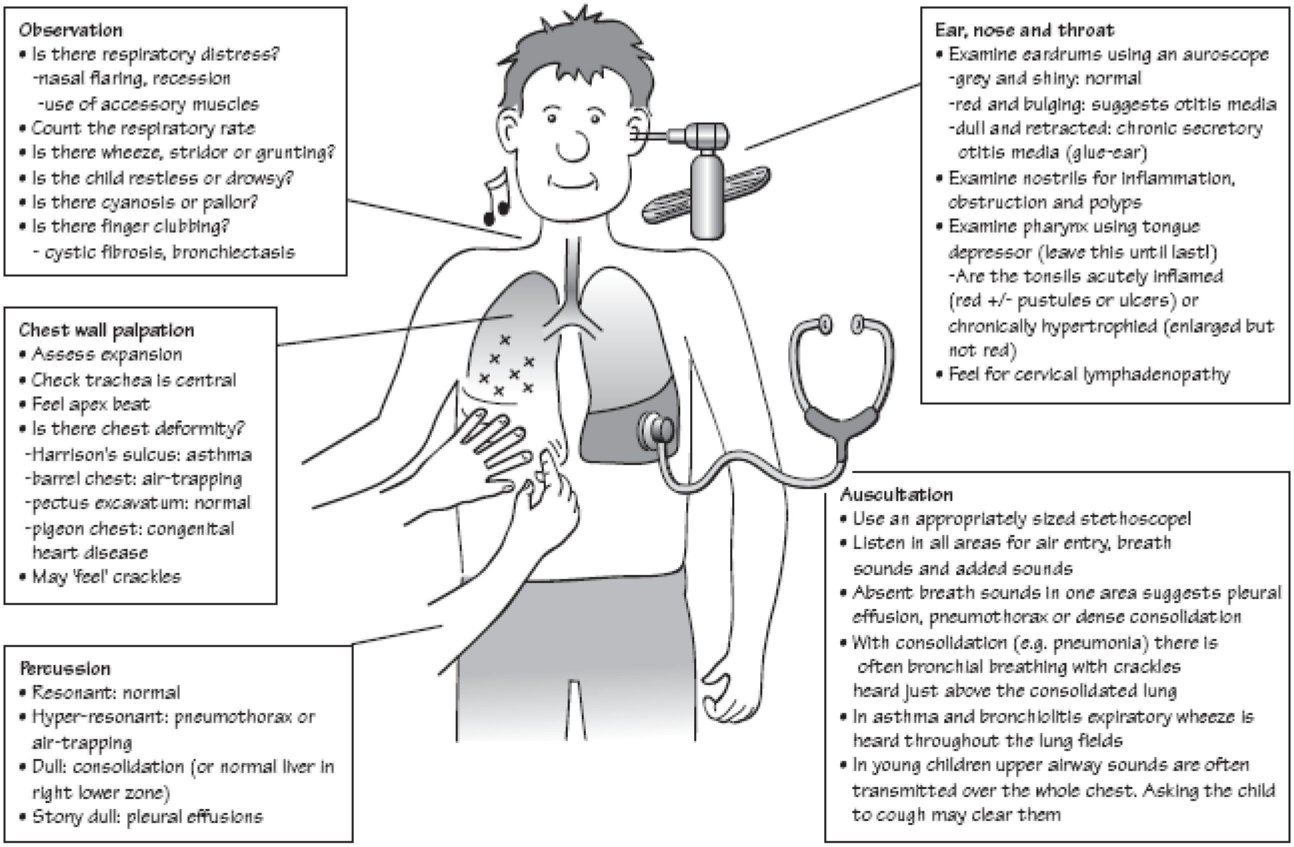
Example :
Child 15kg weight how to calculate dose of bacticlor 250mg ?
Answer :
Required Dose in ml = <u>30(dose in mg/dose) ×(15)body weight×5(spoon)</u> = 3 ml
250(Concentration of susp)
So the required dose = 3ml every 8 hours

In injection form

-Required dose in ml=

<u>Amoun Required in mg/kg/dose×body weight×amount in which you dissolve</u>
Concentration(250 or 500 or 1000 mg ….etc)

Respiratory system



Respiratory system

Drugs of respiratory system

1-*decongestants*

A-local **→allowed after 3 months old**

Oxymetazoline	1-2drops in each nostril Every **12 h** For5days only	**Afrin-ped** N.D **Iliadin merck-ped** N.D	**Long** acting So used every 12 H
Xylometazoline	1-2drops in each nostril Every **8 h** For5days only	**Otrivin**-ped Balkis-ped Rhinex-prd	**Short** acting So used every 8 H
Naphazoline	1-2d/8-12H	**Nostamine**	**Nasal&eye drops**

N.B

1-**from 6 years old** use adult nasal drops
2-if loca decongestant has to be used for long period every 5days stop ttt for2 weeks
3-**nasal saline** can be used in newborns&infants < 3 months
preparations→ Lyse nasal drops
Otrivin baby saline nasal drops
Salinol nasal gel
Physiomere nasal drops (40 جنيه)
dose→1-2 drops in each nostril /**before feeding**

B-systemic →

-Decongestant only	Sudophine syrup	
-Decongestant+antihistamine	**Actifed** syrup Sine up syrup Balkis syrup Triaminic drops	**Dose** in all preparations -1-2 years…2,5cm tds ->2 years…5 cm tds
-Decongestant+antihistamine + antipyretic	Congestal ,cometrex **Michaelon** ,dolo-d Brufen flu	**Dose** in all preparations -1-2 years…2,5cm tds ->2 years…5 cm tds

N.B

1-start with use of local decongestants and if failed to improve Condition →use systemic decongestants

2-systemic decongestants are contraindicated in bronchial asthma &bronchitis→cause dryness of secretions

3-abuse of systemic decongestants can cause severe irritability&crying Especially *rhinostop drops*

4-preparation contaning *phenyl propanolamine* aracontraindicated in Pediatrics e.g.…noflu,antiflu,flurest,flustop,rhinomol syrup

2-Cough preparations

A-Hebal preparations for dry cough :

- sina dry (9,90)
- balsam(7,45)
- herba cough(9,75)
- tussinor(6,75)

Dose→ < 1 year …..2,5 cm tds
> 1 year…..5 cm tds

B-chemical preparations for dry cough:

-selgon(pipazethate)
Dose……1-2mg/kg/day
Preparations…..drops→ 1 drop/kg/day
supp→10mg/supp
tab→20mg/tab

-paxeladine or oxeladine
Dose…..1-2mg/kg/day
Preparations…..syrup→10mg/5ml
capsule→40mg/cap

N.B →Although it suppress cough it do not interfere with Expectoration so allowed in asthma

-silomat(clobutinol)
Dose…..1-2mg/kg/day
Preparations…..**drops** →1 drop/kg/day
syrup→5 cm/kg/day
tablet →40mg/tab

N.B →Although it suppress cough it do not interfere with Expectoration so allowed in asthma

-dextromethorphane
Dose…….1-2mg/kg/day <1year..2,5cm/tds ->1year..5cm tds
Preparations….codilar, tussilar ,tussivan-n syrup

C- suppositories for dry cough:

selgon→ the best
rectoplexil→contain antihistamine
eucaphol→some claim that it cause hyperpyrexia
cough seed→ infantil supp….cotain 100mg paracetamol
children supp…. cotain 250mg paracetamol

N.B

-Cough suppressants are **should not** be used with productive cough → retention of secretions in chest

-**Except**→cough is severe ,distressing ,preventing baby from sleep used as **asingle dose** at night (**mainly supp)**

3-*mucolytic expectorants*

A-**<u>herbal preparations:</u>**

-preparations e **mild** mucolytic expectorant effect:
Fast(7) ,Thymy(5) , Thymotal(9.75) ,Formix(6)

-preparations e **moderate** mucolytic expectorant effect:
Sina wet ,**Broncare** ,Alveoline , Bronche ,Pentamix ,Babe tone

-preparations e **strong** mucolytic expectorant effect:
Broncho syrup(خلاصه ورق البلاب)

<u>Dose</u> in all preparations-------< 1 year 2,5 ml / **صباحا وعصرا فقط**
> 1 year 5 ml / **صباحا وعصرا فقط**

B-**<u>Chemical mucolytics</u>**

-Bromhexine

Dose…..,5-1mg/kg/day
Preparations....Drops→Bisolvone drops
Syrup→Bromhexine , Bisolvon 4mg/5ml
Tablet→ Bromhexine , Bisolvon ,Solvin 8mg/tab

-Ambroxol

Dose…..1-2mg/kg/day
Preparations....Drops→Ambroxol ,Mucosolvan 1 drop/kg/day
yrup→Muco , Mucosolvan weight/2 per day
Tablet→Ambroxol

-Cabocisteine

Dose…..10-20mg/kg/day
Preparations…Rhinathiol 100mg/5ml
Mucosol 125mg/5ml
Mucolase , Ultasolvin 250mg/5ml

C-**<u>Non herbal expectorants:</u>**

Bronex drops
Avipect , Koffex ,Expectyl , Pulmonal-n ,Actifed expectorant syrup
Phenergan expectorant syrup

N.B

1-try to **avoid** preparations contaning antihistamines or decongestants
As it cause dryness of secretions e.g **toplexil** syrup
2-**the best** mucolytic agent is water **i.e** ↑ fluid intake during illness
3-the therapeutic value of the drugs **Is doubtful** &there is no critical
Choice BW different preparation

4-Bronchodilators:

A-β adrenergic agonists

Salbutamol	oral→,1-,2mg/kg/day inhalation→100-200 mcg/dose neubilizer→,1-,3**ml**/kg/dose	oral→**Salbovent**,Salbutamol ventolin الاخضر (2mg/5ml) **inhalation**→Vental inhsler **Ventolin evohaler** (100mcg/puff)
Terutaline	oral→,1-,2mg/kg/day inhalation→200mcg/dose	oral→**Aironyl** ,Bricanyl (1,5 mg/5ml) inhalation→Bricanyl inhaler (200mcg/puff)
Fenoterol		Brotec syrup

N.B

B2 agoinsts should not be used **continuosly** for more than **2 weeks**
Other with adaptation of receptor occur & **discotiuation** of drug
Should be done
Although B2 receptors become fully developed at **12-18 months**
B2 agoinsts **can** be used before this age because receptors
Are present but its sesitivety is low which improve gradually
By time
-some patients may not respond well to salbutamol &respond
Trebutaline &**vice versa**

-B_2 agoists are present **in combination with**

1-Expectorants e.g ….ventolin expectorant الاحمر

Farcolin , Bronchovent , Octivent , Brozedex

2-Mucolytic &Expectorants e.g…Osipect , Allvent

B-other adrenergic agonists:

-isoprenaline sulphate

→Effective in patient < 1 year

→Alubent syrup

→Dose…….1 cm/5 kg/day orally

-adrenaline

→Dose….,01mg/kg/dose S.C

→Prepations……adrenaline amp(1mL) 1mg/ml

C-xanthines:

Theophyline **aminophyline**	oral→15-20mg/kg/day **Iv→only** **-If other therapy has failed** **- In icu where serum level Can be monitored** **… Loading dose….6mg/kg over 30 min (provided no theophyline in last 24 H)** **…maintenance….,5-1mg/kg/H (if theophyline is given in last 24H)**	**oral→** **mucophyline** (100mg/5ml+bromhexine) **Dose=** $\frac{weigt}{6}$ **/day** Farcosolvin (طعمه وحش)&**trisolvi** (50mg/5ml+ambroxol+ guaiphensin) **Dose=** $\frac{weigt}{3}$ **/day** Minopyline,Etaphyline Amriphyline→100mg/5ml Epicophyline(125mg/5ml) **supp→** Etaphyline, Amriphyline (100mg/supp) Minopyline,farcophyline (125mg/supp) **parentral→** Minopyline(125 , 300, 500) 5ml 2ml 3ml Etapyline (500/5ml)

Diseases of respiratory system

A-common cold

symptoms:

-Runny nose ,sneezing

-Mild fever ,mild cough

-Irritability...in neonates&young infants

-Sore throat….in older children

Signs:

-Mild congested throat

±Edematous uvula

Treatment:

→ neanates &young infants:

-normal saline nasal drops

-herbal preparations

±antipyretics(paracetamol)

±antihistamines(fenistil)

….in severe cases

…..provided free chest

Example

Lyse nasal drops

2-1 نقطه فى كل فتحه انف قبل الرضاعه

Flucease syrup 2.5 سم بالفم 3 مرات يوميا

Tempra syrup ± الوزن/2 كل 8 ساعات

Fenistil drops نقطه/كجم مساءا

→infans > 3months:

- use pediatric nasal decogestants

→ > 1 year:

you can add systemic decongestant

Example

Afrin ped nasal drops

نقطه فى كل فتحه انف كل 12 ساعه لمده 5 ايام

± Congestal syrup

± Dolphin 12,5 mg supp

N.B

See drugs of respiratory system (decongestsnts)

B-allergic rhinitis

symptoms:

-paroxismal attack of:

watery nasal discharge

prominent sneezing&ithing in nose

-allergic manifestation else where in Body

-no fever

Signs:

-pale nasal mucosa

-hypertrophied turbinates

من الاخر---الم تقولك الولد عنده برد صيف وشتا بيعطس كتير(3-4 مرات ورا بعض) بيهرش فى الانف

DD:

Vasomotor rhinitis(wet type)

Treatment:

→prophylaxis:

-Avoidance of PPT factors

Ingestants (specific diet)

Inhalants (dust)

Ingectants (specific druge)

-Mast cell stabilizers

Nasotal nasal drops

نقطه فى كل فتحه انف-3 مرات يوميا لمده شهر

±Antihistamines…cetrak syrup

→curative:

-systemic anti histamines

-nasal corticosteroids in resistanyt cases

Example

Cetrak tab قرص مساء

Flixonase nasal spray(27.5)

Beconaz nasal spray

2 بخه فى كل فتحه انف كل 12 ساعه

N.B

Local CST **should not** be used < 6 monthOld

Systemic CST **are of no role** in allergic rhinitis

C-sinusitis

symptoms:

-high fever especially acute sinusitis
-mucopurrulant nasal discharge & Nasal obstruction
-prolonged cough >2 weeks
Provided……mid night or early Morning cough
…… free chest
-pain over affected sinus
-headache(in children > 4years)

Signs

-post nasal discharge
∟**greenish or deep yellowish**
-thick puurrulant nasal discharge
∟**on inferior turbinate**
-tenderness over affected sinuses
∟**may be abscent**

Treatment:

-Nasal decongestnts
-Analgesic antipyretics
-Antibiotics
±Mucolytics (with viscid secretions)

Example

-Afrin ped nasal drops
نقطه فى كل فتحه انف كل 12 ساعه لمده 5 ايام
-Brufen الوزن/2 كل 8 ساعات
Or dolphin 12,5 mg supp
-Bisolvone tab or **ambrodoxy cap**
-choice of antibiotics……
Amoxycilline
Amoxycilline clavulinic acid
2nd generation cephalosporines
e.g Cefruxime

N.B

There are4 paires of paranasal sinuses
1-Ethmoid
2-maxillary
both are present at birth &continue To grow until puberty
3-frontal…do not develop before age of 7y
4-sphenoid…not fully developed before Adolescent

بمعنى لو فيه ولد اقل من 7 سنين تبقى مش فاهم لو
If you examine for tederness over frontal Sinus ----وهكذا

D-otitis media

-a common cause of **fever without a focus**

-very **common** in pediatrics **because**:

Eustachian tube is shorter ,narrower

More straight

So easily obstructed by:

Common cold d t mucosal oedema

Milk d t feeding in recumbant position

Types:

<u>Acute suppurative O.M:</u>

<u>1</u>-stage of E.T obstruction

complaint→mild deafness

examination→mild drum retraction (-ve pressure in middle ear)

<u>2</u>-stage of catarrhal O.M

complaint→mild fever,mild earache deafness

examination→congested drum

<u>3</u>-stage of suppuration

-before suppuration:

symptoms→

high fever,severe throbbing pain

signs→

bulging drum +severe congestion with pale center

-after perforation:

symptoms→mucopurrulant ear discharge↓ pain

signs→drum perfpration , discharge in E.T

<u>4</u>-stage ofresolution:

Otorrhea & deafness gradually ↓ within 3-4 weeks

Treatment:

<u>1-First line ttt→</u>

In first 48H with mild fever &mild pain **By :**

1-decongestant nasal drops

2-analgesic **anti-inflammatory**

(paracetamol not anti-inflamatory)

<u>+</u>systemic decongestants

(with out antihistamine ?)

<u>Example</u>→

Afrin-ped nasal drops

نقطه فى كل فتحه انف كل 12 ساعه لمده 5 ايام

Dolphin supp

Or **catafly** syrup

Or brufen syrup

<u>2-2nd line ttt→</u>

if complaint is severe from start (high fever &severe pain)

If You reevaluate after 48-72H With no improvement

By1-as above

2-start **antibiotic** therapy

Amoxycillin →**90mg/kg/day**

Amoxycillin clavulinic acid →90mg/kg/day

Cefruxime →50mg/kg/day

Cefpodoxime→10mg/kg/day **orally**

Reevaluate after 48-72H
if improving →contiue AB for

10daysS

3-3rd line of ttt→

If not improving after 48-72H from 2nd line **by**

1-Ceftriaxone→50-75mg/kg/day single daily ingection for three days

2-Diagnostic tympanocentesis→ c&s test

N.B

Topical ear drops→usually comind AB+CST

Neopred-p, **Dextratrol**

Ciprocort ,dexaron plus ,FML Neo

(Of no role if drum is intact)

B-chronic suppurative O.M:

C/P there is persistant discharge& perforation for more than **1 month**

types :

1-tubotympanic

Perforation…central

Discharge…profuse, M P non fetid

2-atticiantral

Perforation…in pars flaccida

Discharge…scanty,purulent,offensive

C-secretory O.M(chronic non suppurative)

D.T long standing obstruction of E.T

→adenoid

→chronic tonsillitis

→allergic rhinitis

Symptoms

hearing loss , recurrent earache

Signs

retracred drum

TTT→

A-Medical:

1-Ttt of PPT factors e.g adenoidectomy

2-Decongestant nasal drops

3-Anti-inflammatory e.g **Maxilase syrup**

4-Mucolytics

5-AB for 10 days

A-Surgical:

Myringotomy &Grommets tube

E-croup

A-acute infectious croup

1-acute viral laryngitis

age→1-3 years
symptoms→hoarsness of foice
brassy cough
mild fever
signs→-mild stridor i.e
abscent during rest
e.g sleep&appear e **crying**
-mild fever
+congested throat

treatment:

1-Inhalation of steam medicated e tinnture Benzoin
2-TTT of nasopharyngitis….
+ Antihistamine
+ Cough suppressant at night

Example→
Vapozole solution
يضاف مكيال(5سم) الى نصف لتر ماء يغلى ويستنشق البخار لمده ربع ساعه كل 8 ساعات مع تغطيه العين
Brufen syrup
+Cetrak syrup

N.B

Volatile oils can be used e.g
Flonaze cap or pulmix cap
توضع محتويات الكبسوله على منديل او ملابس الطفل المخده اللى بينام عليه ا

2-acute laryngio-tracheo-bronchitis

symptoms→as above
+**dyspnea**+**expecroration**
signs→moderate fever
stridor biphasic
i.e inspiratory&expiratory

N.B

grades of stridor:

grade1 →stridor during exertion i.e crying
grade 2→stridor at rest
grade 3→stridor+ retraction
grade 4→strdor+cyanosis

Treatment

-As above
-Herbal mucolytic expectorant
+Antibiotics(if patient looks toxic)
+Cough suppressant at night

Example→
-As above
-Broncho syrup صباحا وعصرا
+Bacticlor susp or Ibidroxil susp

N.B نبه على الام ان يكون عندها امبول ديكسا تديها للولد لو جات للولد بالليل

3-acute epilotitis

Age→ugually . 3 months
symptoms→sudden onset &rapidly progreesive course of :
- -high fever
- -severe malaise
- -severe stridor
- -drolling of saliva

signs→
<u>pharyngeal examination is absolutely contraindicated</u>
→cause reflex vagal stimulation &cardiac arrest
IX→lateral soft tissue X ray on neck →thumb sign

Treatment:
A-Hopitalization
B-Tracheostomy or endotracheal intubation In profound cases
C-<u>Medical ttt</u>:
1-**02**
2-**adrenaline neubilizer**
N.B
Dose ...,1ml/kg/dose of 1:1oooo solution +2 ml saline Every 2-4
(خلى العيل تحت عينك لمده 2ساعه بعد الجلسات)
3-**corticosteroide**
hydrocortisone→solucortef vial
1 cm/10kg/6h IV or IM
dexamesthasone→decadron
1 cm/10kg/8-12h IV or IM
N.B
(Inhaled CST **are far more effective** if available)
4-antibiotic-----<u>on maximum dose</u>
Cefruxime→150-200mg/kg/day OR
Ceftriaxone→100mg/kg/day
+Amoxycillin→ 300mg/kg/day
5-antipyretics anti-inflammatory

4- Mid night croup

-Its allergic or viral condition
symptoms&sign→
Child with nasopharyngitis develop an attack of croupy cogh&stridor
→Attack subside with few hours
→By the day the child is normal
→Attack my be repeated in next Few nights

Treatment:
→During attack
- -Adrenaline neubilizer
- -corticisteroide… Solucortef vial
  Segmacorten vial

→Then
- -Vapozol solution
- -Antihistamines

5-laryngeal F.B

Previously normal child **suddenly**
Develop cough , chocking , stridor

F-bronchitis

-**most common** cause of acute cough in pediatrics
-mostly viral

Symptoms→
- -History of common cold for 3-4 days
- -Cough dry then productive
- ± Fever
- ± Vommitting (post tussive)

signs→
- -Absent respiratory distress
- -Harsh vesicular breathing coars
- +Coarse Creption±sonorous rhonchi

N.B

Cough may persist for 2week

G-wheezy bronchitis

previously called asthmatic bronchitis
symptoms & signs→ as above plus
sibilant rhonchi واضحه بالسماعه

Treatment:
ENT referal

Treatment :
1-Herbal mucolytic expectorants
2-Bronchodilators
± Antipyretics
± Nasal drops

Example:
Fast or broncho syrup صباحا و عصرا
Ventolin syrup ثلاث مرات يوميا
± Brufen syrup
± Iliadin meck ped nasal drops

N.B

-try to avoid use of declophenac Preparation as it my ↑ cough (cause bronchospasm)

TTT→
As above +
↑ bronchodilators i.e↑dose (**4 times/day**)
Or use 2 drugs

N.B

Antibiotics do not affect course cough

When to use antibiotics?
- -Fever is persistant
- -Patient looks toxic
- -Sputum is purelan

What is the Choice of antibiotic?
- -Amox-clavulinic acid
  20-30mg/kg/dose
- -2nd generation ceph→Cefaclor
  10mg/kg/dose Every 8 hours

Acute bronchiolitis

-actue **viral** infection that affect small Bronchioles causing there partiel Obstruction→ respiratory distress

-caused by →respiratory sencitial virus

-age →3months-2 years e peak around 6 months

<u>Symptoms→</u>

First….common cold (nasopharyngitis) Fever,runny nose, for 2-3 days

Then..rapid development of moderate to Severe dyspnea,cough,wheezing Feeding difficults

Finally….improvent within few days

<u>signs →</u>

-respiratory distress

(tachypnea, working ala nasi, retraction,Grunting , cyanosis)

-Auscultation:

Diffuse sibilant rhonchi

Harsh vesicular breathing e prolonged Expiration

±Fine creptition at end of inspiration

<u>X ray</u>

Hyperinflation ± are of segmental collapse

Treatment: <u>4H</u>

1-**<u>H</u>**ospitalization of severe cases

2-**<u>H</u>**umidified o2 age →most important

3-**<u>H</u>**ydration→oral OR iv

4-**<u>H</u>**ydrocortisone(**drugs**) →

a-Bronchodilators…β2 agoinsts even under 1 year

(inhalated β2 agoinsts are more effective)

b-Hydrocortisone…can be used as asingle at night e.g:

-Sigmacorten vial (400mg/vial)

-Solucortef vial (100mg/vial)

Tonsillitis

Age

uncommon before 1year

Peak incidence at 4-7years of age

Etiology

In children<2year….mostly viral

In children>5years…mostly bacterial

C/P

<u>viral tonsillopharyngitis:</u>

-**History** of....rhinorrhea,conjunctivitis,cough
Or hoarseness of voice

-**Fever**….is low grade(~38c)or high grade(~40c)

-**In younger infants**…irritability,refusal of feeding

-**In older children**…**moderate** sore throat,dysphagia

-**Throat examination**...mild erythema of tonsils&pillars
<u>+</u>Small ulcers on soft palate
No pus follicles , no membrane

Treatment:

-Soft diet

-Excessive warm fluids

-Analgesics antipyretics

<u>+</u>Decongestant nasal drops

Example

-Brufen syrup wt/2every6-8H
OR Dolphin supp
<u>+</u>iliadin merck N.D

<u>Streptococcal tonsillopharyngitis:</u>

-**Fever**….moderate fever(~38.5-39.5)

-**Severe** sore throat&dysphagia

-vomitting & **abdominal pain**(dt mesenteric adenitis)

-**Throat examination...**
diffuse erythema of tonsils&pillars
+pus follicles or membranous exudates

-**Anterior cervical lymphadenopathy**…
anterior cervical L.N are enlarged&tender

Treatment:

-As above

-Antibiotics

Choice of antibiotic

-amox &amox-clavulinic acid

-ampicillin sulbactam

-first generation cephalosporin

-pencillin(oral - procaine)

N.B

-**no** need for **AB** in viral tonsillitis

-**no** need for parentral **AB** in Bacterial tonsillitis

-3rd gerneration cephalosporins Are **Not** effective in tonsillitis (week anti gram +ve)

-**AB** should be used for **7 days** **even** the child had improve

-**mouth gargles** can be used in older childrens e.g
Antiseptol M.W (usede`outdilution)
Betadine M.W

N.B

-tonsillitis or pharyngitis is the most over- diagnosed condition in pediatrics

-tonsillitis or pharyngitis is rare uncommon below2 years

Chronic tonsillitis:

-Shape…..irregular(d.t fibrosis)
-Size…..unequal(↑ or↓)
-Pharynx…..congested(especially anterior pillar)
-Cervical lymph nodes….persistant enlargement
-On pressing ant pillar(by tongue depressor)… oozing of pus from crypts
-Halitosis

Indication of tonsillectomy:

-Repeated attacks of acute follicular tonsillitis
(> 7 attack per year or >5attacks in 2 years)
-One attack of peritonsillar abscess
-Chronic tonsillitis
-In association with of adenoidectomy
-Previous documented history of rheumatic fever
-Tonsillar tumors
-Tonsillar forgein body

Bronchial asthma

Definition…

-**chronic** inflammatory disorder of the airway that cause **recurrent** episodes of **wheezing,breathlessness,chest tightness and coughing** particulary at night or early morning in susceptible individuals

-these episodes are associated with:

→wide spread airway obstruction of variable degree

→revesibility of this obstruction either spontaneously or as result of ttt

→increase in existing bronchial hyper-responsivness to a variety of stimuli

Clinically…

symptoms→

1-**Wheezing** high pitched whistling sound when breathing out **is the cardinal sign**
Wheezing however may be abscent in severe cases d.t. the small tidal volum

2-**Cough** which worsen by night & is unproductive early in the attack

3-**Difficulty of breathing**

4-**Chest tightness**

-in severe cases the child may be unable to walk or talk and may assume a hunched over Sitting position(i.e bent or curved position)which make it easier to breath

-symptoms occur /or worsen at night or early morning ,walking the child from sleep

- symptoms occur /or worsen in presence of triggers of asthma

- eczema,allergic rhinitis or family history of asthma or atopic disease are often present

Cough variant asthma

Some cases of asthma present with recurrent cough particularly at night with **no wheezing**
They respond to **B-agoinsts and/or steroid**

Consider that in children

-Wheezing does **not** always mean asthma

-Asthma may be present **without** Wheezing(silent chest)

signs→

-Tachpnea ,tachycardia

-Hyperinflation of the chest

-Signs of respiratory distress e.g nasal flaring, intercostals&suprasternal retraction
Cyanosis in severe cases

Clinical grading of acute asthmatic attacks:

-<u>Grade1(mild acute asthma)</u>→wheezing only
Prolonged expiration&expiratory wheezing only
No respiratory distress or diminished air entry

-<u>Grade2(moderate acute asthma)</u> →wheezing+tachypnea
Prolonged expiration&expiratory wheezing
Rapid respiration(tachypnea) & slight diminished air entry

-<u>Grade3(severe acute asthma)</u> →wheezing+retraction
Prolonged expiration&expiratory wheezing
Tachypnea,retraction(intercostals,suprasternal) & moderate diminished air entry

-<u>Grade4(profound acute asthma)</u> →wheezing+cyanosis
Rapid respiration,marked retraction and cyanosis
Markedly diminished air entry
Silent chest(minimal or absent wheezing)

Management:

A-Treatment of acute attack of asthma:

Assess severity
(see clinical grading of asthma)

↓

Intial treatment
Inhaled short B2 agoinst(Farcolin)up to 3 times with15 min apart ,3cm/10kg
± Anticholinergic(Atrovent) 1cm/10kg once

↓

Good respond =mild episode

Incomplete response =moderate episode

Poor response =severe episode

B-Then

1-Mild to <u>moderate</u> attack:

Use one or <u>two</u> bronchodilator at home→

1-B2 agoinst:(the best ttt)

-**Salbutamol**

Inhalation→100-200 mcg/dose(vental inhaler ,ventolin evohaler100mcg/puff)√

Oral→,1-,2mg/kg/day(salbovent,salbutamol, ventolin 2mg/5ml)

-**Terutaline**

Oral→,1-,2mg/kg/day(aironyl ,bricanyl 1,5 mg/5ml)

Inhalation→200mcg/dose(bricanyl inhaler 200mcg/puff)

2-Theophyline: ×

Mucophyline (100mg/5ml+bromhexine) Dose=weigt /6 /dose

Farcosolvin & Trisolvin (50mg/5ml+ambroxol + guaiphensin) Dose=weigt /3 /dose

2-Severe attack (hospital management)

Neubilizer + 4H

<u>**A-**Neubilizer:</u>

<u>In emergency departement</u>

Farcolin … ,3ml/10kg+2ml saline can be repeated for **3 times** with 15 min apart

Atrovent(250mg/2ml)………….... 1ml/10kg+2ml saline for one time

Combivent(Farcolin+Atrovent)……1ml/10kg/dose can be used from start

<u>In hospital</u>→farcolin is given every 2-3 h then every 4-6-8 h as patient improve

<u>**B-** 4 H:</u>

-**H**ospitalization(better in icu)

-**H**ypoxia ttt oxygen by face mask or nasal prongs(**better heliox=70%helium+**O_2 30%)

-**H**ydration IV fluid to prevent dehydration(excessive H2O vapor loss dt tachypnea)

-**H**ydrocortisone **every 6 hours for 2-3 days only**

Dexamethasone ,4mg/kg/dose **(1ml/10kg iv**)

Solucortef 5-10mg/kg/dose **(1ml/10kg iv)**

Solumedrol 1mg/kg/dose

-**AB….**for fear of nosocomial infection (antigram +ve &antigram -ve)

N.B

IV Aminophyline……Minopyline(125/5ml , 300/2ml, 500/3ml)& Etaphyline(500/5ml)→**<u>only :</u>**

-**If** other therapy **has failed**

- In ICU where serum level Can be monitored

Loading dose….6mg/kg over 30 min (provided no theophyline in last 24 H)

maintenance….,5-1mg/kg/H

N.B

What is The best manner of home management ?

1-Inhaled B2 agoinsts (<u>should be used with spacer</u>)

e.g **Ventolin** evohaler (**البخاخه الرصاصى**)

اربع بخات كل 6 ساعات لمده اربعه ايام

اربع بخات كل 8 ساعات لمده اربعه ايام

اربع بخات كل 12 ساعات لمده اربعه ايام

2-Inhaled corticosteroids: (<u>should be used with spacer</u>)

e.g **Beclosone** inhaler (**البخاخه الوردى**)

2 بخه كل 8 ساعات

2 بخه كل 12 ساعه(مع تحسن الحاله)

N.B

-Combined B2 agoinsts+corticosteroids inhaler **not** to be used before **12 years** old

e.g Clenil inhaler

-**<u>Why therapy is preferred &has many advantages over oral Medications?</u>**

1-**Onset of action** far more rapid (**in 2-3 min**) compared 20-30 min in oral

2-**Peak bronchodilator effect** is greater

3-**Dose much smaller** (**< 10% of oral equivalent**) → so **less side effects**

4-**Far more effective** in blocking exercise-induced bronchospasm

C-Long term control ………stepwise drug therapy:

	Long term control
Step 1 Intermittent asthma	No daily long-term medications Short acting β2 agoists **PRN**
Step 2 Mild persistant asthma	Low dose inhaled corticosteroids **OR** **Other** alternatives: -oral leukotriene modifiers √ -oral sustained release theophyline X
Step 3 Moderate persistant asthma	medium dose Inhaled steroids **OR** **Other** alternatives: low dose inhaled steroids**+either** -Inhaled long acting B2 agoinsts -oral leukotriene modifiers -oral sustained release theophyline
Step 4 Severe persistant asthma	high dose Inhaled steroids **Plus one of the following:** -Inhaled long acting B2 agoinsts -oral prednisolone - oral leukotriene modifiers -oral sustained release theophyline

-the above mentioned steps therapy should regularly reviewed every 1-6 months for **stepping up or stepping down** according to Response

-"rescue course" of oral prednisolone can be given at any itme or any step 2mg/kg/day in 2divided doses **for 3days**(maximum 40mg/day)

Estimated Comparative Inhaled Corticosteroid

Drug	Low Daily Dose			Medium Daily Dose			High Daily Dose		
	Child 0–4 y	Child 5–11 y	Adult	Child 0–4 y	Child 5–11 y	Adult	Child 0–4 y	Child 5–11 y	Adult
Beclomethasone HFA, 40 or 80 mcg/puff	NA	80–160 mcg	80–240 mcg	NA	> 160–320 mcg	> 240–480 mcg	NA	> 320 mcg	> 480mcg
Budesonide DPI 90, 180, or 200 mcg/inhalation	NA	180–400 mcg	180–600 mcg	NA	> 400–800 mcg	> 600–1200 mcg	NA	> 800 mcg	> 1200mcg
Budesonide inhaled suspension for nebulization, 0.25-, 0.5-, and 1.0-mg dose	0.25–0.5 mg	0.5 mg	NA	> 0.5–1.0 mg	1.0 mg	NA	> 1.0 mg	2.0 mg	NA
Flunisolide, 250 mcg/puff	NA	500–750 mcg	500–1000 mcg	NA	1000–1250 mcg	> 1000–2000 mcg	NA	> 1250 mcg	> 2000mcg
Flunisolide HFA, 80 mcg/puff	NA	160 mcg	320 mcg	NA	320 mcg	> 320–640mcg	NA	640mcg	> 640mcg
Fluticasone HFA/MDI, 44, 110, or 220 mcg/puff	176 mcg	88–176 mcg	88–264 mcg	> 176-352 mcg	> 176–352 mcg	> 264–440 mcg	> 352 mcg	> 352 mcg	> 440mcg
Fluticasone DPI, 50, 100, or 250 mcg/inhalation	NA	100–200 mcg	100–300 mcg	NA	>200–400 mcg	>300–500mcg	NA	> 400 mcg	> 500mcg
Mometasone DPI, 220 mcg/inhalation	NA	NA	220 mcg	NA	NA	440 mcg	NA	NA	> 440mcg
Triamcinolone acetonide, 75 mcg/puff	NA	300–600 mcg	300–750 mcg	NA	> 600–900 mcg	> 750–1500 mcg	NA	> 900 mcg	> 1500mcg

DPI, dry powder inhaler; HFA, hydrofluoroalkane; MDI, metered-dose inhaler; NA, not available (either not approved or no data available or safety and efficacy not established for this age group).

When to give long-term control medications?

The“three strikes rules”are used to identify asthmatic children who are in need for controller medications

The asthmatic child is in need of controller medications if has **any** of the following criteria:

1-If he has asthma symptoms more than **3 times** per **week**

2-If he has night symptoms more than **3 times** per **month**

3-If he need to use more than **3 container** of relief inhaler per **year**

N.B

Asthma my be:

1-intermittent…..the is no symptoms between the acute attack&chest is completely free

It can be classified into:

-infrequent intermittent(recur every several weeks or months)

-frequent intermittent(recur every few weeks)

2-seasonal…..symptoms develop in certain seasons (inhaled cst can be used during this season)

3-persistant asthma…..there is persistant symptoms between attacks

It can be classified(according to severity of symptoms) into:

Degree of severity	**Symptoms of asthma**	**Night-time symptoms**
Mild persistant	>3 times per week	> 3 times per month
Moderate persistant	daily	>1 time per week
Severe persistant	continuous	More frequent

N.B

Oral Mast cell stabilizers (ketotifen)

Dose…… ,05mg/kg/day in 2 divided doses (5ml OR 1 Tab /20kg/day)

Preparations……Zaditen –Ketoti-Zylofen Syrup 1mg/5ml

Zaditen –Ketoti-Zylofen Tab 1mg/Tab

Side effects……drowsiness ,increase appetite

No longer recommended in asthma TTT

Can be tried in preschool children with mild persistant asthma

Inhaled corticosteroids:

Beclomethasone

Dose……100mcg/dose TDS (2puffs every8-12h)

Preparations ….. Beclosone Becotide inhaler 50mcg/puff

Budesenides

Dose …..100-200mcg/dose twice daily

Preparations ….. Pulmicort turbuhaler 100&200 mcg/puff

Fluticasone

Dose ……50-100mcg/dose twice daily

Preparations ….. Flixotide inhaler 50&125 mcg puff
Flixotide diskus 50&100&250 mcg puff

All inhalation medication are used with spacer or airholding chamber

There are two sizes of spacers in market:
-The blue………for children
-The orange……for adult

Leukotreine modifiers

Montelukast

Dose …..4-10 mg oral **once daily every evening**

Preparations …..**Sachet** Singulair sachets 4mg
Tab 4mg **Kokast** ,Singulair ,Clear air (young chilren)
Tab 5mg Montekal ,Singulair ,Asmalair (older children)
Tab 10mg Montekal ,kast ,Indulair ,Clear air ,Asmalair (adult)

N.B Leukotreine modifiers can be used in non persistant as they decrease frequency of Use of B_2 agoinsts inhalers

GIT

GIT

GIT DRUGS

antiemetics

1-***Domperidone***	1 mg/kg/**dose** **N.B** **1-** Domperidone unlike metoclopromide Do not cross blood brain barrier **but** You should calculate accurately as B B B is not well developed in pedia **2-**in case of vomiting associated e diarrhea You can use motinorm supp after diarrheal Motion لبوسه كل 8 ساعات حتى يتوقف الترجيع بحيث تدى اللبوسه للعيل بعد مره اسهال **3-**in GERD Domperidone is given in adose Of 1mg/kg/**day** 15 min before feeding	Motinorm Farcotilium Motilium **syrup**→5mg/5ml **supp**→ infant 10mg/supp children 30mg/supp adult 60mg/supp **tablet**→10mg/tab
2-***Cortigen B6***	Suprarenal gland extract + pyredoxine (cortisone 50 or 100 mg) (vit B6) **N.B---** Cortigen contain cortisone so should **be Avoided** in patients receiving live attenuated vaccines	Cortigen B6 Pediatric …50mg Adult….100mg
3-***ondansetron***	8-15 kg→2 mg/dose 15-30 Kg→4 mg/dose >30 kg→8 mg/dose By **IM** or IV injection	Ampoules Zofran→4mg(27,5) 8mg(54,2) Danofran→4mg(16) 8mg(30)

4-Metocloprpmide	,5 mg/kg/day -Ampoules….1 ml/10 kg/**day** -Drops…..1 drop/kg/dose -Infantil supp…1 supp/10kg/**day** **N.B** This drug should not be used in pediatrics Can cause serious extrapyramidal mainfestations **C/P** →convulsion →oculogyric movements →locked aw →torticollis **Ttt** **Akineton** **Dose**….1 mg slowly iv over 20 min Can be repeated e in 20 min Or …..1/2 tab dissolved in acup of Water and give ½ cup **Preparation** …amp→5mg/ 1ml tab→ 2mg/ tab	Primpran Plasil **Amp**→10 mg/ 2ml **Drops**→,15-,2mg/drop **Supp**→ infantile…10mg adult…..20mg
5-Trimebutine	5-10 mg /kg /day i.e **1 cm /kg /day** In three divided doses before feeding **N.B** Used **mainly** in GERD	Gast-reg susp G-regular

Spasmolytic & antiflutlents

1-For neonates	**Dose**… ملعقه صغيرة قبل الرضاعه بربع ساعه **Dose**….2 drops /kg/dose 4-5 times Before feeding **N.B** **Overuse** of these drugs can cause **Conistipation** OR **paralytic ileus**	Pedi-water syrup Aquacure syrup Grip water syrup Dentinox colic syrup Simethicone drops Dysflatyl drops Baby rest drops Spasmotal , babytal drops
2-**infant &children** A-***Visceralgine***	,5-1 mg/kg/day Syrup form is what we use in pedia < 1year….2,5 ml /tds berore feeding >1year….. 5 ml /tds berore feeding **N.B** Tab can be used at 9-10 years old	**Visceralgine** syrup 10 mg/ 5ml Supp 20mg/supp Tab 50 mg /tab **Timogen** &spasmofree syrup
B-***Buscopan***	,5-1mg/kg/day **Syrup**…..As visceralgine **Amp**……1 cm/40kg /day **Tab**… 5-8 years....1/2 tab tds before meal > 8 years…..1 tab tds before meal	Farcorelaxin syrup 5mg/ 5ml Buscopan… syrup 5mg/5ml Tab 10mg /tab Amp 20mg /1ml
C-***Bellacid***		Bellacid tab
D-***Spasmin supp***	< 2 years…..1/2 supp PRN > 2 years…..1 supp PRN	Spasmin supp

Conclusion من الاخر

syrup→farcorelaxin ….2.5 ml if < 1 year or 5 ml if > 1 year
supp→ spasmin ………1/2 supp if < 2 years or 1 supp if > 2 years

Antihelminthic drugs

Mebendazole	**Oxyuris**→(100 mg) i.e one tab or 5 ml **once weekly** for 3 weeks before breakfast **Ascaris**→ & **Anylostoma** (100 mg) i.e one tab or 5 ml **twice daily** for 3 days **N.B** Mebendazole →safe from first day of life →safe in pregnancy&lactation	- Antiver - Anthelmin -Vermin **susp**→100mg/5ml (30ml) **tab**→100mg /tab (6 tab) -Verm 1tab **500mg**
Albendazole	**400mg /day i.e** 2 قرص من اى نوع او 20سم بنداكس(الزجاجه 60سم=3جرعات) او 10سم فرميزول(الزجاجه=3جرعات) اوزجاجه الزنتال كامله (الزجاجه=جرعه واحده) **Oxyuris** → 400mg/day single dose /week repeated for 3 weeks **Ascaris** & **Ankylostoma** →400mg/single daily dose for 3 succesive days **Strongloids**→400mg/day before breakfast for 7 days **Tenia saginata** & **Tenia solium** →400mg/day before breakfast for 7 days(but poor result) **N.B** Albendazole →not safe before 2 years old →not safe in pregnancy&lactation	**Bendax** →susp..100mg/5ml (30 &**60** ml) →tab..100mg/tab (6 tab) **Alzental** →susp..100mg/5ml (20ml) →tab…200mg/tab (6 tab) **Vermizole** →susp..**200mg**/5ml (30 ml) →tab…200mg/tab (6 tab)

Nilosamide	- **<11kg** body weight→not used - **11-34 kg** body weight →1gm(2 tab) first day →Then ,5 gm(1 tab)for 6 days مضغ قبل الفطار بساعه ->**34 kg** body weight →2gm(4 tab) first day →Then 1gm(2 tab)for 6 days مضغ قبل الفطار بساعه **N.B** -used in **ttt** of **Taenia saginata, taenia soliu& H.nana**	**Yomesan** tab 500mg/tab Niclosane tab 500mg/tab
Praziquantil	Bilharziasis→40mg/kg single dose better in middle of fatty meal can be repeated after 1 week Strongloids &H.nana→25mg/kg single dose	Epiquantil **susp**600mg/5ml Distocide & Biltricide **tab** 600mg/tab

Conclusion من الاخر

1-oxyuris→

C/P…. Ithing around anus especially at night

Drooling of saliva الولد **بيريل** على المخده بالليل

الام تقولك شفت ديدان صغيره فى البراز بتاع الولد

May not appear in stool analysis(need **perianal swab** at night)

Ttt…....Anthelmin , Antiver , Vermin →5ml or 1tab /week for 3 weeks

Or Alzental →2 tab or one bottle / week for 3 weeks

Bendax→2 tab or 20ml / week for three weeks

Vermizol→2 tab or 10ml /week for three weeks

\+ 1-family treatment→كل الاسرة تاخد العلاج فى نفس الوقت

2-improve personal hygein of patient i.e

-قص الاظافر

غسيل الايدى بعد الحمام و قبل الاكل

-غلى الملابس الداخليه

\+ topically→ **white PPT** ointment or any preparation contaning **zn oxide**

2-ascaris &ankyiostoma→

Ttt…Anthelmin , Antiver , Vermin →5ml or 1 tab / twice daily for 3 days

Or Alzental →2 tab or one bottle / day for 3 days

Bendax→2 tab or 20ml / day for 3 day

Vermizol→2 tab or 10ml /day for 3 day

3-strongloids→

Ttt …..praziquantil→25mg /kg single dose…….as above

Albendazole→400mg / day for 7 day

Ivermectin→150- 200 mcg / single dose

4-t.saginata &t.solium→

Ttt...... Niclosamide→see antihelminthic drugs

praziquantil→5-10 mg /kg single dose

Albendazole→400mg / day for 7 day

5-H.nana → Niclosamide →As above or Praziquantil ….25 mg /kg single dose

Antiprotozoal drugs

N.B

Amoebiasis can occur in **any age** even < 1year
Diagnosis by…… stool analysis
Amoebiasis……..vegetative form or cystic form

<u>Anti amoebiasis</u> **paromomycin**	25-35 mg/kg/day in 3 divided doses For 5-7 days **N.B** - **Safe** from first day of life - **Active against cystic&vegetative** form - **No** metallic taste - **Safe** in pregnancy&lactation	Gabbroral Susp 125mg/5ml Tab 250mg/tab
Diloxanide	10 mg/kg/day in 3 divided doses For 7-10 days In susp form 2-5 yrars old→5ml / tds 5-7 years old→7.5 ml / tds > 7 years old→10 ml / tds **N.B** -not safe before 2 years - drug of choice against cystic form	Present in combination with Metronidazole: -Furazole **-Dilozole** **-Dimetrole** .Susp=100mg diloxanide +200mg Metronidazole .Tab=250mg diloxanide +200mg Metronidazole
Tinidazole **Scinidazole**	30-50 mg/kg/day single daily dose For 3 days **N.B** -not safe before 3 days -very bad taste so يتاخد فى وسط الغذاء مع عصير -common side effect… nausea, headache Vommitting & anorexia	**Protozol tab** tab 500mg/tab **Fladazol** **Sachet** &tab 500mg
Metronidazole	35-50mg/kg/day in 3 divided doses Fore 7-10 days **N.B** 1-**safe** from first day of life 2-active maily against **vegetative** form 3-main side effect →**metalic taste**	Flagyl,Dumozol Entophar,Amrizol →susp..125mg/5ml tab...250 ,500 mg/tab **Flagellat forte** susp **200mg**

Other drugs **Nitazoxanide**	-Furazolidone -Chloroquine -iodoquinolone **N.B** These drugs are contraindicated in G6PD↓ 1-4 years old→5ml/12h for 3 days 4-8 years old→10ml/12h for 3 days Active against **Giardia**,**Rota virus** N.B Can be used in patients <2 years with **H.nana**	 Nitazode susp 100mg/5ml

Conclusion من الاخر

A-In cystic form→< 2 years…..Paromomycin
or Metronidazole for one week then no ttt for one week then Metronidazole for another week
→ > 2 year …diloxanide metronidazole combination for 10 day

B-In vegetative form→ metronidazole whatever age for 7 days

Giardiasis

-can also occur in any age
-symptoms may be more severe than amoebiasis
-suspect when there is **fat globules** in stool(fat malabsorption)

Ttt: The same as amoebiasis But for **5-7** day

Diseases of git

A-*Teething and its problems*

Eruption of teeth may cause inflammatory changes&swelling of gum

Symptoms→irritability ,loss of appetite ,excessive salivation ,finger suckling

الولد بيعيط -مقريف-مبيرضعش-بيريل-يعضعض فى صوابعه-بيطلع لسانه لبره

Signs→oedema±erythema of gum

eruption cyst may beseen

erupting tooth(lower central incisors) may be seen

N.B

Many conditions are ascribed to teething such as diarrhea , rash, chesy troubles But any real correlation is doubtful

TTT→

A -Local anaethetics(teething gel) e.g

Oracure oral gel

Dentocaine oral gel

N.B

-**Dentocalm** oral gel contain clove oil (زيت قرنفل) cause **burning sensation** Mouth

-**Over use** of these topical anaethetic drugs my cause numbness &anaethesia Of entire pharynx→inhibition of gag reflex→**serious aspiration** occurs

B-Systemic analgesics e.g

Paracetamol→ Tempra ,Cetal

Ibuprofen→ Brufen

C-Teething toys العضاضه →for distraction purpose only

تقول للام تجيب صوبع موز او جزرة مقطعه حلقات وتحطها فى الفريزر شويه وبعدين تديها للولد يعضعض فيها

i.e →cause numbness in gum

D-Massaging gum ???

Delayed teething

الولد عمره اكبر من سنه ولسه مبدأش يسنن

Examine for other signs of rickets

TTT→prophylactic dose of vit D_3 400 iu/day e.g **Vidrops** 4-10 drops /day

B-Gingivostomatitis

Infectious:	Non infectious
A-**viral:** 1-**herpetic stomatitis** **Aetiology** →HSV-thpe 1 **clinically**→ -abrupt onset of fever,oral pain,malaise -Salivation,Refusal of feeding -oral lesions appear 1-2day later vesicles→rupture→ulcer -2-10mm in size -covered e grayish membrane -on tongue , checks but can affect all Oral mucosa -submaxillary lymphadenopathy is common -**dehydration** is the main **complication** **DD**→ -**herpangia**...high fever,sore throat ±vomiting,headache,abd. pain **Oral lesions**→discret ulcer Surrounded by red margin **On** pillar,tonsils,pharynx **But** not on cheecks or gum -**chichen pox**…skin rash are characteristic -**measles**…kopliks spots **TTT**→ ممنوع الاكل او المشروبات الساخنه ممنوع المشروبات الحمضيه (الليمون والبرتقال) ياخد حاجات مثلجه كتير **1-systemic analgesic antipyretics**→ Paracetamol , brufen , declophenac **2-local anaethetics**→ BBC spray (**the best drug**) Oracure oral gel Dentocaine oral gel Xylocaine viscus تستعمل قبل الرضاعه او الاكل ب 5 دقائق	**A-Eruptive stomatitis**→see above **B-Aphthus ulcer** -well circumscribed ulcer e white base &congested margin -In any area of oral cavity especially floorOf mouth,ventral surface of tongue But never over hard palate **N.B---** In **recurrent** aphthus ulcer **search** for: -vit deficiency -GERD -psychological trouble e.g الولد بدأ يروح الحضانه او المدرسه الام حامل اولسه مخلفه قريب **TTT**→ **1-Topical applications**: - Solcoseryl oral paste يستخدم 3-4 مرات فى اليوم Or Mundisal oral gel دهان على القرح 5-6 مرات يوميا Or **Jogel** oral gel Or **Kenalog in orabase** (cotain triamcinolon 38 جنيه) **N.B--1** نبه على الام انها تنظف القرحه بقطعه شاش قبل الدهان **N.B—2** Salivex paint -used in older childrens -cause severe pain on application **2-Systemic analgesics**: -Paracetamol -Ibuprofen -Declophenac

3-**in….**severe cases Immunocompromised Neonates **Systemic antiviral** are used **Acyclovir** **dose**→10mg/kg/dose 5 times /day for 5-10 days **preparation**→zovirax susp **400mg**/5ml (100ml 47جنيه) → Novirus susp **200mg**/5ml (125ml 33جنيه) **4-IV** fluid e prolonged refusal of feeding **B-Fungal** **<u>Aetiology</u>**→candida albican **<u>clinically</u>**→numerous small white flaks covering oropharyngeal mucosa & tongue →if removed b tongue depressor Leave red haemorrhagic surface +salivation,pain,refusal of feeding **<u>DD</u>**→ 1-milk cruds on tongue: can be removed easily leaving normal surface under it 2-geographical tongue: Of no clinical signifigance **<u>TTT</u>**→ **drops**…..(better than gel) Mycostatin .Fungiststin ½-1 dropper **under tongue** drop by drop Every 6 hours for 7 days **Gel**…. Miconaz , Daktarin, Micoban(cotain local anaesthetic too) دهان للسان كل 6 ساعات لمده 7 ايام	**C-Traumatic ulcer**→history of trauma **D-Local reaction**→chelitis due to sensitivity to contact substances in toys,food,pacifier **E-Drugs**→phenytoin corrosives **F-Micronutrient deficiency**

C-Gastroesophogeal reflux disease

Two questions

1-It **is Regurgitation or Vomiting ?**

In regurgitation→ Not accompanied e nausea No forceful contraction of abd muscles	In vommitting→ Associated e nausea There is forcible contraction of abd muscles

2-If Regurgitation it is Physiological or Pathological?

Physiologica	Pathological
-Called posseting -Weight is **not** affected -Volume is small in amount 1-2 mouthfuls -Occur short time after feeding - Need **no** ttt	-Called **GERD** **-Weight is affected** -Volume is large enough to **soak clothes** or sheet -Occur immediately or several hours after feeds **-Need ttt**

C/p of GERD:

1-Regurgitation
2-Failure to thrive (poor wt gain)
3-Aspiration of refluxed fluid→nocturnal cough
Recurrent aspiration pneumonia
4-Esophogitis→irritability &crying in young infants or heart burn&dysphagia in olders

IX→

1-Gatrographin swallow
2- US toexclude CHIPS
3-Esophagial ph monitoring!!!

TTT→

1-**Non pharmacological**=instructions

-Small feeds→ at more frequent intervals
-Eructationend of feeding→at middle & of feeding
-Positining→ النوم على البطن مع رفع الرأس والصدر 30 درجه
-Thickening formula→ 3-2 ملعقه سيرلاك او نشا تضاف فى الببرونه مع كل رضعه
لكن ممكن تسد فتحه الببرونه لذلك ممكن توسعها شويه
-Special formula→nutrilon AR
Babelac AR
∟=antiregurge

2-Pharmacologlical ttt

-Protokinitic drugs →Gast-reg susp 1 cm/kg/day in 3doses 15 min before feeding
-H_2 blockers→ rantidine 5mg/kg/day (aciloc 75 mg/tab)
-Proton pump inhibitors→ omeprazole ,5-1 mg/kg/day single daily dose
-Antacid→ infant 5ml tds
Children 10ml tds

3-surgical ttt

-Persistant reguegitation (inspite of ttt)with→failure to thrive
Chronic pulmonary comx
Apenic spells

D-GASTROENTRITIS =Diarrhea ± Vomiting ± Fever

Causative organism	Viral	Bacterial	Protozoal
	Rota virus 1st day→fever,vomiting, ↑intestinalSounds 2^{nd} day→severe watery diarrhea+congested throat 3^{rd} day→diarrhea ↓ 4^{th} day→svere watery diarrhea again **Other viruses** Enterovirus,echovirus, Coxackievirus	**E.coli** -Non pathogenic -Pathonenic→ -Enteroinvasive -Enterotoxigenic -Enteroadhesive **Other bacteria** Salmonella,shigela, Campylobacter	Entamoeba hitolytica Giardia lambilia
Stool Criteria	-Watery(may be confused as urine) -High frequency -No blood -no mucous -no tenasmus -usually no abd pain	Watery High frequency(but less than viral) Little mucous More blood Tensmus Abd pain on &off شويه وشويه	Semisolid Less frequent More mucous Little blood Severe tensmus Severe abd cramp
Fever	Low grade(38'c)or high grade(40'c)	Moderate grade fever(38.5-40'c)	No fever
Stool analysis	Free i.e no pus cells no mucous	Pus cells+bood+mucous	Entamoeba Or giardia +mucos&blood

Treatment= **Fluid+Food±Drugs(ارواء+إغذاء±دواء)**

A-**General TTT→**

-O.R.S.....oral rehydration solution

± Antiemtics

±Antipyretics

±Antispasmoidics

B-**Specific TTT** →

Viral	**Bacterial**	**Protozoal**
Only general ttt No need for antibiotic therapy	**Antibiotics are indicated only in:** -patient in shock -severe toxaemia -parentral diarrhea(d.t infection outside git) -causitive organism(stool culture)is Salmonella,shigella,campylobacter **Choice of antibiotics:** -Smx-TMP→1cm/kg/day in 2 doses -ceftriaxone→50-75mg/kg/day single daily -cefotaxime→100-150mg/kg/day in 2 dose -Ximacef→8mg/kg/day every 12 h -Vancomycin→last drug to be used	See git drugs … Antiprotozoal drug

O.R.S

-Awell balaced mixture of electrolyties &glucose(added to ensure maximal absorption of water&Na)
-Used in ttt of all types of dehydration,potassium depletion,base deficit caused by diarrhea

Preparations→

Hydrosafe…..(طعم البرتقال)الاحسن من حيث الطعم

Rehydrozinc….الاحسن من حيث التركيب لكن طعمه وحش ممكن يخلى الولد يرجع

Lowhydran…… low Na content(designed to ttt secretory diarrhea of v.cholera)

N.B ready made O.R.S→babysol bottle زجاجه محلوله جاهزه

Dose→10-20 ml/kg/day(Maximum 1 sachet /kg /day)

< 10 kg weight……..60-100 ml/ motion

>10 kg weight……..100-140ml /motion

i.e

1-يحل الكيس فى 200 سم ماء سبق غليه ويعطى 20 ملعقه صغيره بعد كل مره اسهال او ترجيع او نصف كوب بعد كل مره اسهال او ترجيع ببطئ (تدى ملعقه وبعد دقيقتين ملعقه وهكذا)

2-اذا الولد مقبلش المحلول او رجعه←تنبه على الام

- تدى المحلول ببطء شويه يعنى كل 5 دقائق ملعقه

او- يوضع المحلول فى الفريزر لمده ربع ساعه وده بيحسن طعمه شويه

او – ممكن تحلى كيس المحلول على زجاجه سبرايت او سفن اب بعداما ترجى الزجاجه وتسبيها تفور شويه

N.B

Home made O.R.S→

كوب ماء+ملعقتين عسل ابيض+ربع ملعقه بكنج بودر+عصر نصف ليمونه

(يعنى عصير ليمون متحلى بالعسل الابيض ومضاف اليه ربع ملعقه بكنج بودر)

Diarrhea&diet→

1-antidiarrheal diet…..

ماء ارز-ماء نشا- عصير تفاح-عصير جوافه-شاى خفيف+معصور عليه ليمون-عصير ليمون(سكر خفيف)

مهلبيه- جيللى-زبادى

معكرونه مسلوقه-رز مسلوق-لسان عصفور

تفاح-موز-كمثرى-جوافه

2-diet that ↑ diarrhea……

عنب-بطيخ-مشمش

عصير البرتقال-المياه الغازيه

Sugary food&drinks→cause osmotic diarrhea

Dehydration

Types of dehydration:

-Isotonic→normal serum Na (135-153 Mequ/l)
-Hypotonic→serum sodium <135 mequ/l
-Hypertonic→serum sodium >153 mequ/l

Degree of dehydration:

TABLE 33–5. Assessment of Degree of Dehydration

	Mild	Moderate	Severe
Infant	5%	10%	15%
Adolescent	3%	6%	9%
Infants and young children	Thirsty; alert; restless	Thirsty; restless or lethargic but irritable or drowsy	Drowsy; limp cold, sweaty, cyanotic extremities; may be comatose
Older children	Thirsty; alert; restless	Thirsty; alert (usually)	Usually conscious (but at reduced level), apprehensive; cold, sweaty, cyanotic extremities, wrinkled skin on fingers and toes; muscle cramps
Signs and Symptoms			
Tachycardia	Absent	Present	Present
Palpable pulses	Present	Present (weak)	Decreased
Blood pressure	Normal	Orthostatic hypotension	Hypotension
Cutaneous perfusion	Normal	Normal	Reduced and mottled
Skin turgor	Normal	Slight reduction	Reduced
Fontanel	Normal	Slightly depressed	Sunken
Mucous membrane	Moist	Dry	Very dry
Tears	Present	Present or absent	Absent
Respirations	Normal	Deep, may be rapid	Deep and rapid
Urine output	Normal	Oliguria	Anuria and severe oliguria

Management:

-Evaluation of degree of dehydration

.Frequency of diarrhea….mild 4-6 times /day
Moderate 6-10 times /day
Severe > 10 tlmes /day

.Amount of diarrhea
.Presence of vomiting
.Tears present or not
.Tongue dry or not
.Urine output ?
.Conscious level

-Fluid therapy:

a-Antishock therapy

	...if the baby is **shocked** ↓	…if **not shocked** but severe dehydration ↓
Amount	20ml/kg over **20 min**	20 ml/kg over **1 hour**
Type	ringer's lactate or Normal saline	ringer's lactate or Normal saline

b-Beficit therapy

Amount→mild dehydration…..40 ml/kg
moderate dehydration……80 ml/kg
severe dehydration……..120 ml/kg

Type→in isotonic & hypotonic dehydration
-glucose 5% + normal saline in ratio **1:1** +KCL 15% 1 ml/100ml of solution
Or -kadlex + normal saline in ratio **1:1**
∟contain K

Duration→ over 8 hours

in hyper tonic dehydration
-glucose 5% + normal saline in ratio **4:1** +KCL 15% 1 ml/100ml of solution
Or - kadlex + normal saline in ratio **4:1**
∟contain K

Duration→ over 24 hours

c- maintenance fluid

Amount→ 100 ml/ kg for first 10 kg of weight (wt ×100)
50 ml / kg for second 10 kg of weight (1000+50×[wt-10] if 10 >wt>20)
20 ml /kg for third 10 kg of weight (1500+20×[wt-20]) if wt > 20)

Type →
-glucose 5% + normal saline in ratio **4:1** +KCL 15% 1 ml/100ml of solution
Or -kadlex + normal saline in ratio **4:1**
∟contain K
Or -pansol

Duration→over 24 hour

During next 24 hour

- ↓ If still dehydratred
  Repeat deficit&maintenance
  Therapy over 24 hours
- ↓ if fully hydrated but
  there is severe diarrhea
  or vomiting
  The maintenance therapy
  + expected loss
- ↓ if full hydrated&diarrhea
  is improving
  ½ maintenance iv
  +1/2 maintenance oral
  in gradual manner

Calculation of rate of infusion:

معدل النقط فى الدقيقه **بجهاز المحلول العادى**= الكميه / (عدد الساعات×3)

معدل النقط فى الدقيقه **بجهاز السلوسيت**= الكميه / عدد الساعات

Conistipation

Definition→

Constipation is defined as *two or fewer stools per week or passage of hard, pellet-like stools for at least 2 weeks*

.

N.B….1

Parents may have different descriptions about what is constipation. They may be referring to straining with defecation, a hard stool consistency, large stool size, decreased stool frequency, fear of passing stools, or any combination

I.e ***careful analysis of complaint***

N.B…2

Infants may experience symptoms of straining for prolonged periods and crying, followed by passage of soft stool. This pattern of difficult defecation is called **infantile dyschezia** and is present only in the first 3 months of life

I.e ***straining is normal till age of 3 months***

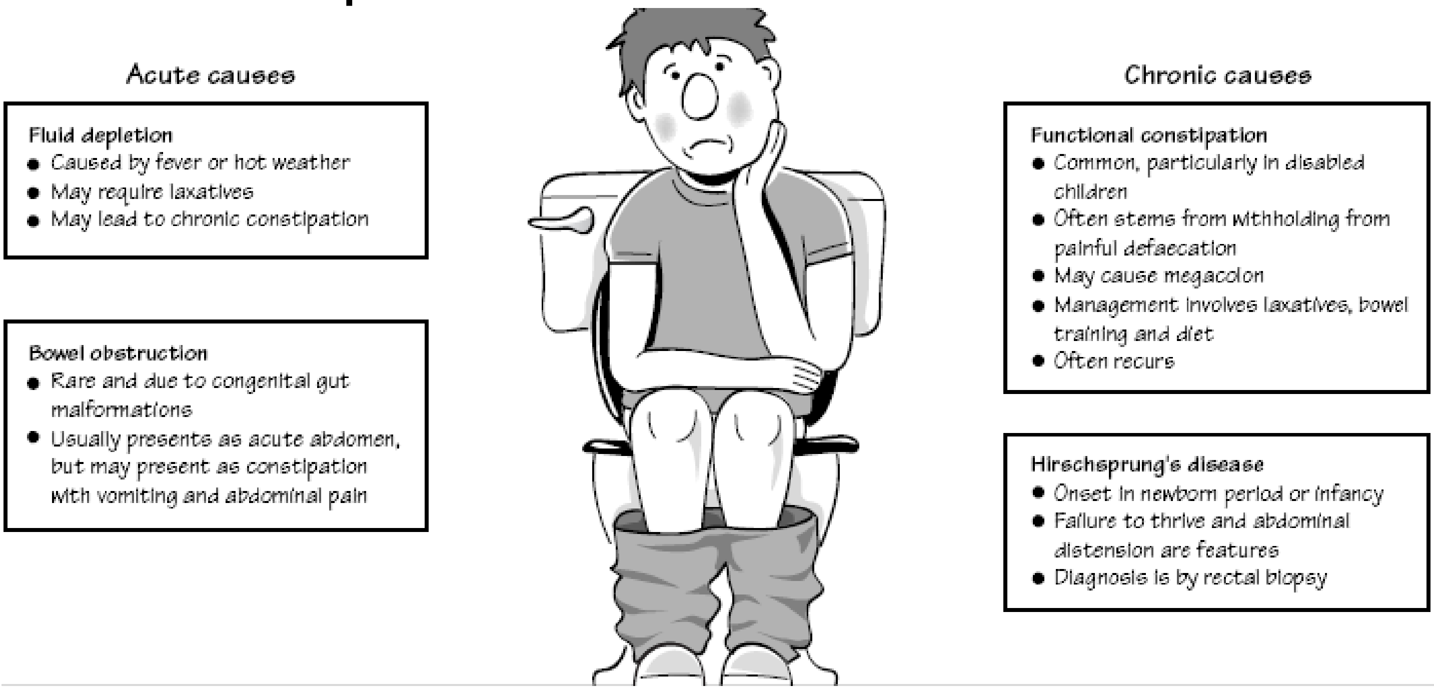
In chronic constipation →2 or more of the following should be present

1- < 3 bowel movement / **week**
2- > 1 episode of **encropresis / week**
3- Impaction of rectum with stool
4- Rerentive posturing(standing or sitting with legs extended and stiff or crossed legs)

N.B…3

Encropresis →Involuntery leakage of fecal liquid from proximal colon around the hard impacted stool in The dilated rectum leading to soiling of under wears

Causes of constipation



A-Functional→

-**Incidence**→90%of causes of conistipation in beyond neonatal period are functional

-***Mechanisn & causes***→

Voluntary withholding of defecation→**why?**

1-incorrect attempt in toilet training
2-intentional withholding as during school,traveling,family stress
3-emotional disturbances
4-+ve family history

↓

Distention of rectum&colon

↓

↓sensitivity of pressurereceptors in rectum

↓

↓ defecation reflex&effectiveness of peristalsis

↓

Hard large stool in the rectum that is difficult&painful to evacuate

↓

Complications of constipation→**whate are?**

1-fecal impaction
2-anal fissure
3-abd pain
4-voiding dysfunction→stasis→uti
5-encropresis

B-Organic

1-*In neonates*

-Anal stenosis

-Imperforate anus---- usually discovered during rectal measurement of tempreture

-Muconium plug

-Hirschspring's disease---------------------Hirschsprung's disease results from the failure of normal migration of ganglion cell precursors to their location in the gastrointestinal tract during gestation. The diagnosis can be made by obtaining an unprepped **barium enema**, which will demonstrate a change in the caliber of the large intestine at the site where normal bowel meets aganglionic bowel (transition zone). An unprepped barium enema is required because the use of cleansing enemas can dilate the abnormal portion of the colon and remove some of the distal impaction, thereby resulting in a false-negative result. After the study, the retention of barium for 24 or more hours is suggestive of Hirschsprung's disease or a significant motility disorder. **Rectal suction biopsies** or **full-thickness surgical biopsies** will confirm the absence of ganglion cells. Anal manometry is less reliable in children; in small infants, it requires specialized equipment.

-intestinal stricture

∟ following necrotizing enterocliotis

-hypothyrodism

-Spinal Cord Defects

2-*infant &children*

-Obstructive lesions→ e.g intussuception , **hirschspring's disease**

partial I .O e.g pyloric stenosis

-Dietary causes→insuffecient intake of milk&fluid ,intake of diet low in vegetable fiber content

- Painful anal&perianal conditions→anal fissure ,peianal dermatitis
- Muscular hypotonia→ **rickets** , down $, myopathies
- Neurological causes→ **cerebral palsy** , spinal cord lesions

-Endocrinal&etabolic→ hypothyrodism , hypokalaemia , hypercalcemia **hyperviyaminosis D**

-Drugs→ antimotility(as **antispasmoidics**) , anticholinergics , opiates

N.B

How important is the rectal examination in patients with constipation?

Extremely important. The presence of large amounts of stool in the rectal vault almost always indicates
functional constipation. If no stool is present, Hirschsprung's disease and abnormal anorectal anatomy should be considered

Treatment:

1-TTT of **cause**→inorganic type

2-**Non** pharmacological ttt→

-clearance of impacted fecal mass by **enema** (100 ml only)

-regular post prandial **toilet sitting** …..in older infants

-giving attention to any under lying **psychological problems**

-dietary management→see later

3-Pharmacological ttt→**laxatives**

1-contact laxatives:

-Glycrine infantil supp

Used in **acute** constipation onlt for **temporary** relieve

Overuse cause laxative dependence

-Abilaxine, Bisadyl supp

2-osmotic laxatives

-Magnisium hydroxide

Dose……… 1teaspoon /10 kg once at night

Preparations……. **Laxomag susp**

Very safe in pediatrics

-Lactulose

Dose…… 3 cm /kg at night or in divided doses

Preparations…….duphalac ,laxolac susp

-**Agiolax sachets**……..one sachet at night

-Importal sachets……… no more avaible in market

Diet &constipation

-Before weaning→we can give water(after boiling) in between feds

-From 3 months→ orange guice **عصير البرتقال**

-From 4 months→ yugort **الزبادى**

- يمكن اضافه 2 ملعقه رده الى الزبادى

- العنب- عصير الكانتالوب

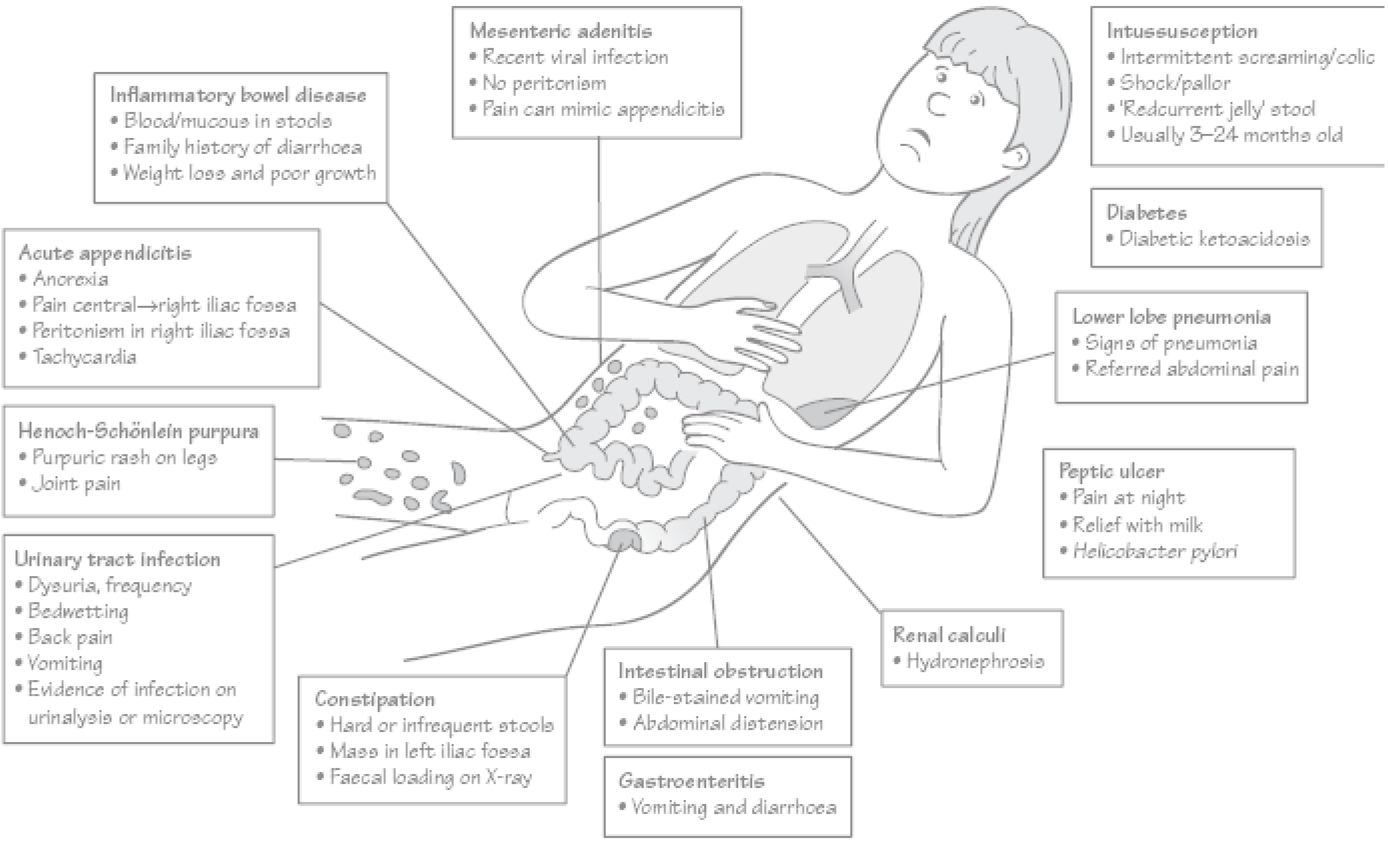
- يفضل تجنب الموز-الجوافه-التفاح-الشاى

- الاطفال الاكبر شويه ممكن يبلع حبيتين ترمس(ترمس ناشف بعد تقشيره)

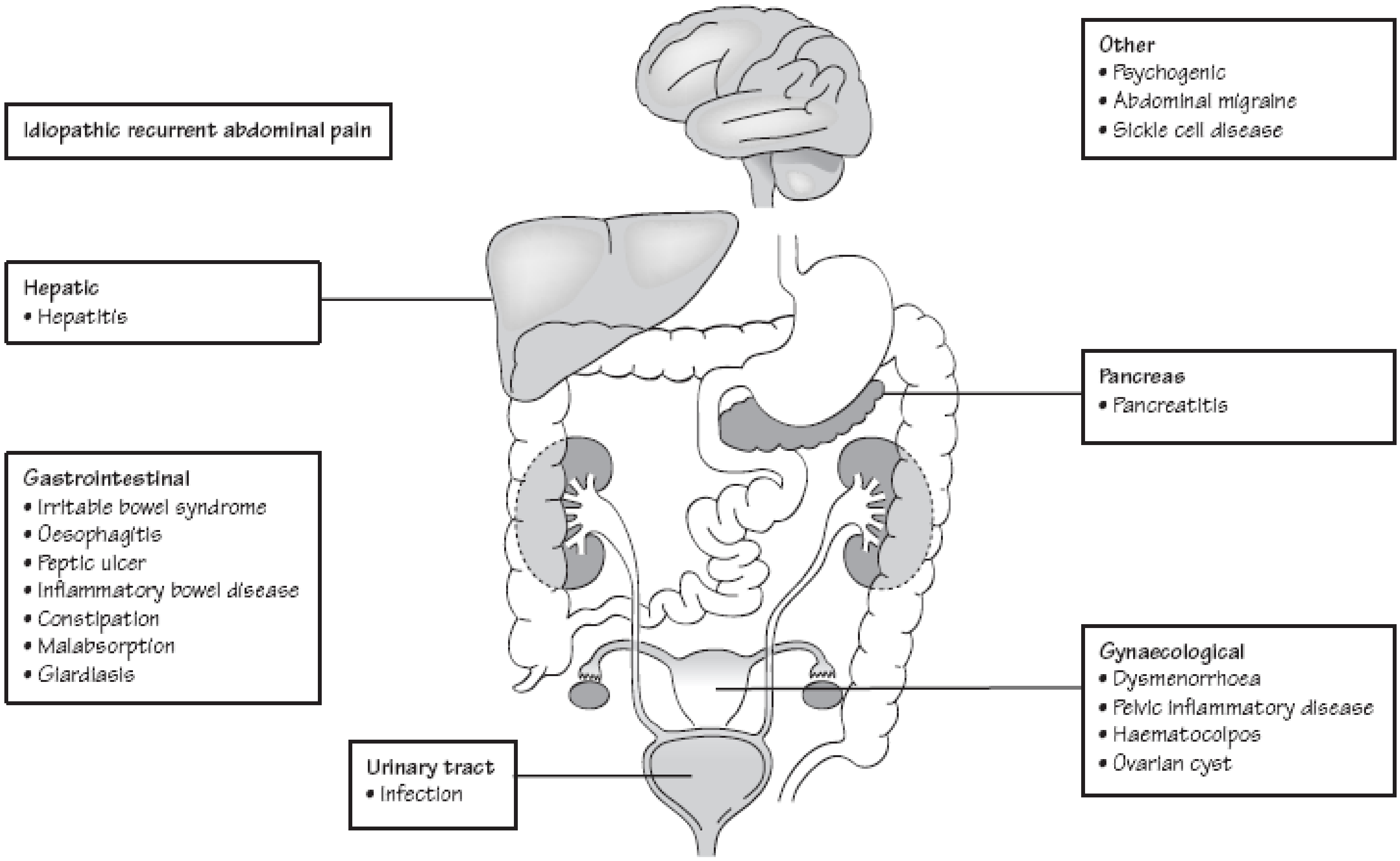
- formula fortified e **iron** may cause conistipation **اسأل على نوع اللبن**

Abdominal pain

Causes of acute abdominal pain



Causes of recurrent abdominal pain



What you need from your evaluation

History

- Obtain a good description of the pain. Where is it? (non-organic pain is classically periumbilical) Does it affect daily activities?
- Are there constitutional symptoms such as anorexia, weight loss or fever?
- Are there gastrointestinal, urinary or gynaecological symptoms?
- Are there emotional or family problems?

Physical examination

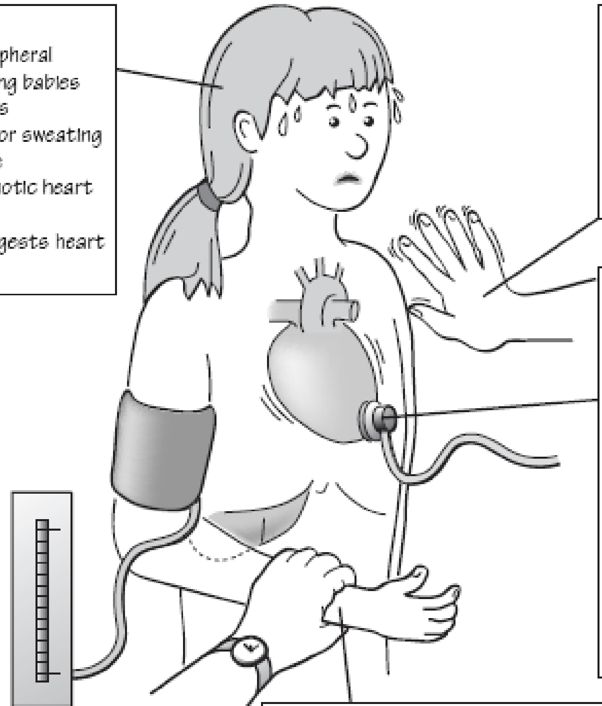
- **Growth:** weight loss or fall-off in growth indicates serious pathology
- **General examination:** look for pallor, jaundice and clubbing
- **Abdominal examination:** is there hepatomegaly, splenomegaly, enlarged kidneys or a distended bladder?
- **Anorectal examination:** not routine in children

Investigations and their significance

Investigations are required only if your evaluation suggests an organic cause

• Full blood count	Anaemia, eosinophilia, infection (leucocytosis)
• ESR or plasma viscosity	Inflammatory bowel disease
• Liver function tests	Liver dysfunction
• Urea and electrolytes	Renal failure
• Amylase	Pancreatitis
• Urinalysis and culture	Urine infection
• Stool for ova and parasites (3 samples)	GI parasites, e.g. giardiasis
• Occult blood	GI blood loss, e.g. inflammatory bowel disease or peptic ulcer
• Abdominal and pelvic ultrasound	Urinary obstruction at all levels, organomegaly, abscesses, pregnancy, ovarian cyst and torsion
• Plain abdominal X-ray	Constipation, renal calculi if radiopaque, lead poisoning
• Barium swallow and follow-through	Oesophagitis and reflux, peptic ulcer, Crohn's disease, congenital malformations of the gut
• Barium enema	Ulcerative colitis
• Endoscopy	Oesophagitis and reflux Peptic ulceration Colitis

Cardiovascular



Observation

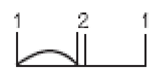
- Is there central cyanosis? Peripheral cyanosis can be normal in young babies and those with cold peripheries
- If the child is breathless, pale or sweating this may indicate heart failure
- Is there finger clubbing? - cyanotic heart disease
- Is there failure to thrive? -suggests heart failure

Palpation

- Feel apex beat (position and character), reflects left ventricular function
- Feel for right ventricular heave over sternum
- Feel for thrills (palpable murmurs)
- Hepatomegaly suggests heart failure. Peripheral oedema and raised JVP are rarely seen in children

Auscultation

- On the basis of the child's age, pulse, colour and signs of failure try to think what heart lesion may be likely, then confirm this by auscultation
- Listen for murmurs over the valve areas and the back (see p. 94). Diastolic murmurs are always pathological
- Listen to the heart sounds: are they normal, increased (pulmonary hypertension), fixed and split (ASD) or are there added sounds (gallop rhythm in heart failure or ejection click in aortic stenosis)?



Systolic murmur

Circulation

- Measure blood pressure with age-appropriate cuff, which should cover 2/3 of the upper arm
- Check capillary refill time; if more than 2 s, consider shock

Pulse

- Rate: fast, slow or normal?

Age (years)	Normal pulse (beats/min)
<1	110–160
2-5	95–140
5-12	80–120
>12	60–100

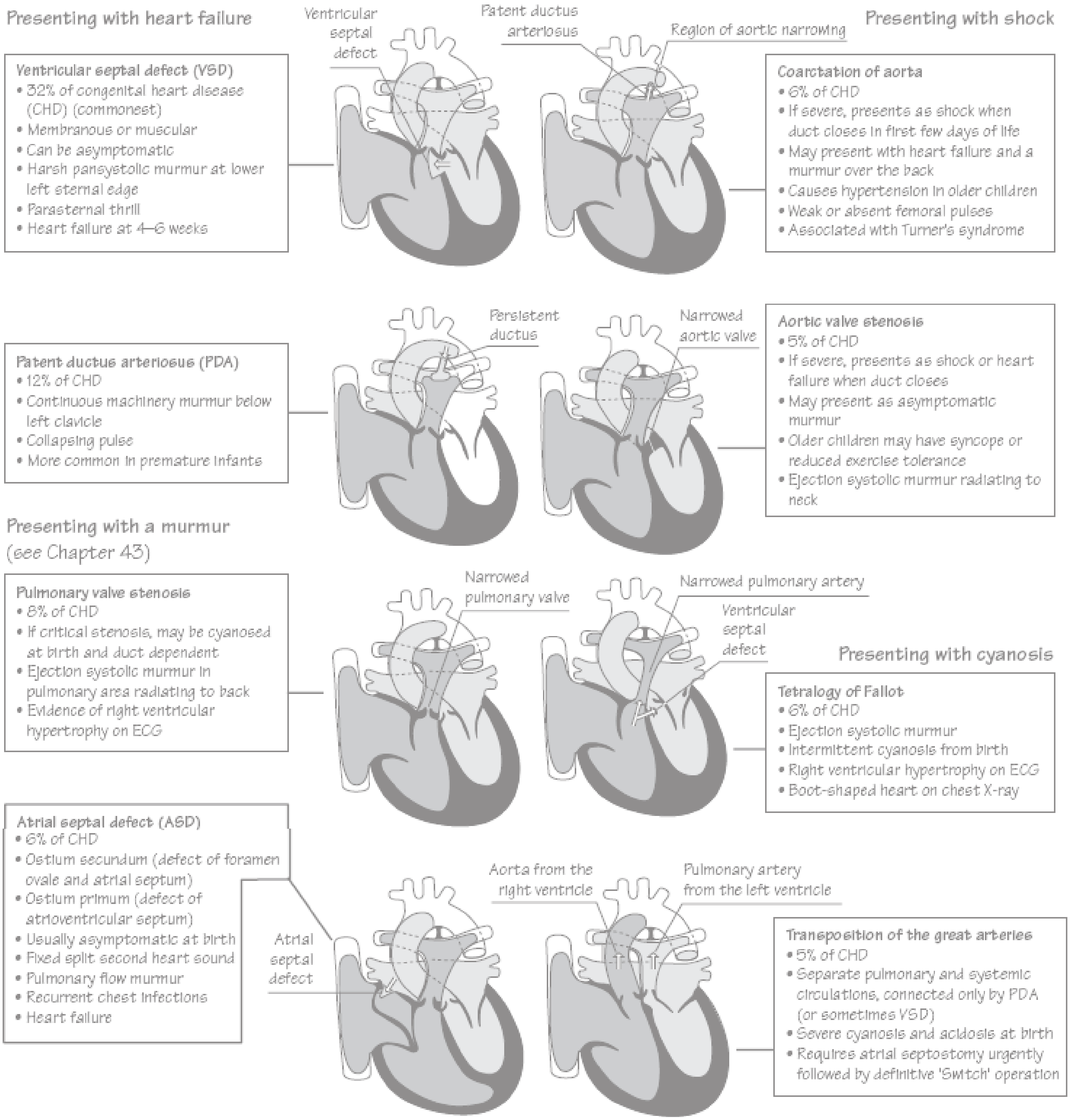
- Rhythm: regular or irregular? Occasional ventricular ectopic beats are normal in children
- Volume: full or thready (shock)
- Character: collapsing pulse is most commonly due to patent arterial duct. Slow rising pulse suggests left ventricular outflow tract obstruction
- Always check femoral pulses in infants—coarctation of the aorta leads to reduced or delayed femoral pulses

You have to auscultate heart in every pediatric case once you hear any abnormal sound -----do Echocardiography

تشك ومتلاقيش احسن متفوت حاجه

A-congenital heart diseases

Presentation of congenital heart defects



Here we will give short notes on most life threatening conditions which are ductal dependant lesions

Duct-dependant lesions

1-Duct- dependant cyanotic CHD

There is critical obstructive lesion of pulmonary blood flow E.G:

1-severe form of fallot tetralogy
2-traspositio of great arteries
3-tricuspid atresia
4-pulmonary atresia

Clinically -----early onset canois,respiratory distrees&obstructive shock in severe cases

2-Duct- dependant non cyanotic CHD

There is critical obstructive lesion of systemic blood flowE.G:

1-critical aortic stenosis
2-critical coartication of aorta

Clinically----poor peripheral perfusion,feeding difficulty,congestive heart failure&cardiogenic shock in severe cases

I.X----doppler Echocardiography

TTT

1-O2……do not give 100% O2

2-**prostaglandin E1 infusion**:

Mechanism:cause relaxation of smooth muscles of ductus

Dose: ,05-2 mcg/kg/min

Preparations: prostin vr amp 500 mcg/ml

S.E: apnea so E.T should be considered

3-surgical correction of defect

B-Rheumtic fever

Autoimmune disease following upper respiratory tract infection with group A beta haemolytic streptococci

5-15 year is the peak but can occur in any **age**

Diagnosis by modified JOhNS criteria:
1-two major manifestation OR one major +two minor manifestations
2-evidence of recent streptococcal infection

MAJOR MAINFESTATIONS

1-**Arthirits**

Incidence: most common manifestation (75%)
Character : 1-polyarticular-----affecting many joints
2-Transient-----affected joint resolve completely within one week
3-Migratory----متنقله من مفصل لاخر
4-Affecting large joints
5-The affected joint IS:swallen,red, hot&withmarke limitation of movement
تسأل الام رجل الولد ورمت احمرت وقفت عن الحركه
6-Dramatic response to slicylate therapy

Treatment:
1-Eradication of streptococci from throat
2-Salicylate:
Dose--------80-100mg/kg/day in three divided doses after Meal for 3-4 weeks
Preparation-------R0anal 500mg/tab ,Alexoprine 375mg/tab
3-Long acting penicillin :for 5 yearsor up to 20 years old which Far ايهما ابعد

2-CARDITIs:

Incidence: noitatsefiam suoires tsom
Character:1-disproportionate tachycardia I.E. increase heart rate by more than 10 beats for every degree rise in tempreture
2-newly heard murmer
3-pericardial rub
I.X: color Doppler
Treatment:1-eradication of strepotococci
2-carditis only:
prednisolone 2mg/kg/day
In 3 divided doses for 3 weeks
Then gradual withdroal
3-carditis&arthiritis:
prednisolone 2mg/kg/day
In 3 divided doses for 2 weeks
Then add salicylate 75-90mg/kg/day
And strart gradual withdrual of prednisolone over 2 weeks
And continue salicylate for 4-6 weeke
4-long acting pencillin:
a-there is valvular lesion-------LAP for life
b-no valvular lesion-----------LAP for 10 years or up to 25 years old which far
ايهما ابعد

3-CHOREA:

Incidence: 10% of cases
Character: involuntary movements
Hypotonia
Emotional disturbances
Treatment:1- eradiction of streptococci
2-Halperidol(safinace)----,1-2,mg/kg/day
Or Phenobarbital(sominalettta)---3mg/kg/day
(Its better to refer the case to pediatric neurologist)

4-ERTHYMA MARGINATUM:

Incidence: 5%
Character: serpigenous lesions
Mainly on the trunk
Increase in size with application of heat

5-SUBCOTANEUS NODULES:

Incidence:1% of cases
Characters: painless nodules over bonny prominences

Minor manifestations

1**-Fever-----**ujually mild to moderate fever
High fever should stimulate search for other cause
2**-Arthralgia---**should not considered as aminor one in Patients with arthritis
3-**Abdominal pain**
4-**Epistaxis**
5-**Prolonged P-R interval**-----should not considered as aminor one in patients with caritis
6-**Acute phase reactant**-----when they are +ve they are (the three)considered as one minorManifestation only

C.R.P

Normal--------<6mg%
It increase----- in hours&decrease in hoursI.E.
يعنى لو عملته بعد 3-4 ايام هيكون طبيعى

E.S.R

normal------first hour 20
second hour 40
it increase ----in days&decrease in days

LEUOCYTOSIS

Normal-------4000-11000/cmm

Evidence of recent streptococcal infection

1-Antistrepotolysin o titer →positive if titer more than 400 todds unit
Rising titer
N.B------ASOT…….increase in weaks&decrease in weaks
2-Antihyaloronidase
3-Antistreptokinase
4-+ve throat culture
5-Recent scarlet fevr

2 major or 1 major+2 minor
+ Evidence of recent streptococcal infection

Common mistakes with rheumatic fever

1-Avoid diagnosis of rheumatic fever in:
Age below 5 years
Absence of major criteria
In case of chronic arthritis or if arthritis
Is monoarticular &non migratory
2-Do not accept history of previous R.F without documentation I.E:
اما الولد كان تعبان هل رجليه ورمت احمرت او وقفت عن الحركه
فين التحاليل الى كان عاملها ؟
هل عملتم اشعه على القلب

3-Recurrent tonsillitis+high E.S.R or high A.S.O.T--------only means
That this patient has streptococcal tonsillitis and not R.F
4-Avoid over diagnosis by accurate interpertion of clinical &laboratory data

Heart failure

Aetiology:

1-Contractility failure-------myocarditis,cardiomyopathy
2-After load failure--------acute glomerulonephritis,critical aortic Stenosis, critical coartication of aorta
3-Preload failure--------hypervolaemia E.G: acute renal failure,excess I.V fluids
Big left to right shuntE.G: ASD,VSD,PDA
4-Arrhythmic failure-------severe tachycardia(paroxysmal supraventricular Tachycardia)

Clinically:

In right side hrart failure ----maifestations of systemic congestion

1-tachypnia
2-tachycardia
3-congested neck vein….difficult to be elicted in pediatrics due to short neck
4-lower limb oedema……..late sign
5-gallop rhythm

In left side heart failure---- maifestations of pulmonary congestion

1-cough,expectoration
2-DYSPNEA,ORTHOPNEA
3-RECURRENT CHEST INFECTION
4-BASAL CONSONATING LUNG CREPTITION

IN COMPANSATING CASES---NO MAINFRSTATION OF LOW CARDIAC OUTPUT
IN DECMPANSATED CASES---THERE IS MAINFESTATION OFLOW CARDIAC OUTPUT E.G:

EASY FATIGBILITY
LACK OF CONCENTRATION
SNCOPAL ATTACKS
OLIGURIA
COLD PALE EXTREMITIES

I nvestigations:

1-Chest x ray---may show cardiomegally or pulmonary oedema

2-Ecg----arrhythmia,myocarditis,chamber enlargement

3-Echo----assessment of myocardial function,diagnosis of underlaying Cause

4-ABG

Treatment:

A-**General**-----1-O2

2-treatment of underlaying aetilogy if present

3-bed rest

4- salt restriction

B-**Specific-----**according to type of H.F:

1-**Preload failure….**diuritics E.G:

Lasix 1-2mg/kg/day every 6 hours

Spironolactone 2-4mg/kg/day

2-**Contractility….**inotropic drugsE.G:

Dopamine 10mcg/kg/min i.v drip in ICU

Dobutamine 2-20mcg/kg/min i.v drip in ICU

Digoxin:

Dose-----,035mg/kg/day

8h 8h

Digitalization dose=1/2 dose……1/4 dose…….1/4 dose

Maintenance dose=1/4 dose once daily or in 2 divided doses

Srart 24 H after intial digitalization dose

كل ايام الاسبوع ماعدا الجمعه

Preparations------Lanoxin:

Drops….,05mg/drop

Tab….,25mg/tab

يذاب القرص فى 5سم ماء ----فيكون 1سم= ,05mg

Ampoules…,5mg/2ml

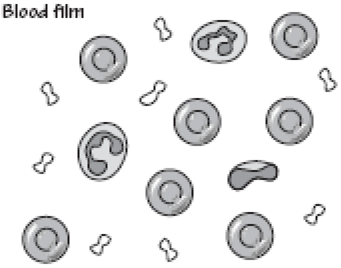
تحل فى 10سم ---فيكون 1سم= ,05mg

3-**after load failure---**vasodilators E.g: Captopril……1mg/kg

HEMATOLOGY

Haemoglobin
- High at birth (18 g/dl), falling to lowest point at 2 months (range 9.5–14.5 g/dl). Stabilizes by 6 months
- Low haemoglobin indicates anaemia. Further investigation will pinpoint the cause (see below)

Blood film



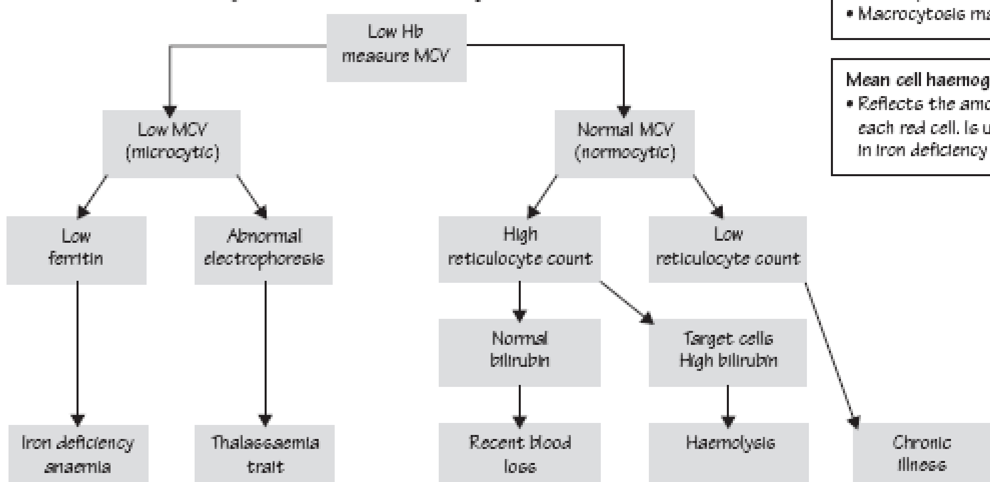
Normal values

Haemoglobin	11 – 14 g/dl
Haematocrit	30 – 45%
White cell count	6 – 15 x 10^9/l
Reticulocytes	0 – 2%
Platelets	150 – 450 x 10^9/l
MCV	76 – 88 fl
MCH	24 – 30 pg
ESR	10 – 20 mm/h

Mean cell volume (MCV)
- Measures the size of RBCs
- Microcytic anaemia (MCV <76 fl) is usually due to iron deficiency, thalassaemia trait or lead poisoning
- Macrocytosis may reflect folate deficiency

Mean cell haemoglobin (MCH)
- Reflects the amount of haemoglobin in each red cell. Is usually low (hypochromic) in iron deficiency

Flow diagram to show the investigation of anaemia



Platelets
- High platelet count usually reflects bleeding or inflammation (*e.g. Kawasaki's disease*)
- Low platelet count is commonly seen with idiopathic thrombocytopenic purpura (ITP) when there is a risk of spontaneous bruising and bleeding. In the newborn it may be low due to maternal IgG-mediated immune thrombocytopenia

Clotting
- Prothrombin time (PT) compared with a control is used to calculate the INR: normal is 1.0. Principally assesses extrinsic pathway. Prolonged in Vitamin K deficiency, liver disease and disseminated intravascular coagulation (DIC)
- Activated partial thromboplastin time (APTT) reflects the intrinsic pathway. Prolonged in heparin excess, DIC and haemophilia A
- Fibrin degredation products (FDPs) are increased in DIC
- Bleeding time: literally the time a wound bleeds for. Prolonged in von-Willebrand's disease and thrombocytopenia

White blood cells
- Leucocytosis usually reflects infection—neutrophilia and 'left shift' (i.e. immature neutrophils) implies bacterial infection. Lymphocytosis is commoner in viral infections, atypical bacterial infection and whooping cough
- Neutropenia (neutrophils < 1.0 x 10^9/l) can occur in severe infection or due to immunosuppression. There is a high risk of spontaneous infection
- Leukaemia: There is usually a very high (or occasionally low) WCC with blast cells seen. Bone marrow aspirate is required (see Chapter 56)

Hematology

How to read CBC ?

N.B CBC=complet blood coun
CBC-D= complet blood coun with differential leukocytic count

WBC	4000-11000/cmm	leukopenia→<4000/cmm causes...typhoid,BM depression eg aplastic anaemia leukocytosis →>11000/cmm causes….infection (bacterial or viral) to DD look at:
	Normal 25-30% (not more than 40%)	← 1-neutrophil **Neutrophilia**=bacterial infection
	At birth65% 2-4 years 45% >4 years 25%	← 2-lymphocytes **Lyphocytosis**=viral infection
	Monocytes 3-7%	Monocytosis : Brucella ,Typhoid TB , chronic infections
	Oesinophils 1-3%	Oesinophilia: Allergies e.g asthma Parasitic investation especially Visceral larva migrans
	Band cells 0%	If present =bacterial infection **N.B..** **-**Bacterial infection→high leukocytosis **+**neutrophilia -Viral infection→mild to moderate leukocytosis +lymphocytosis
Platelet	150000-400000/cmm	Thrombocytopenia →<150,000/cmm Thrombocytosis→>400,000/cmm

Hemoglobin	12-16gm%	. What is the hemoglobin value below which children are considered to be anemic (lower limit of normal)? Newborn (full term) 13.0 gm/dL 3 months 9.5 gm/dL 1-3 years 11.0 gm/dL 4-8 years 11.5 gm/dL 8-12 years 11.5 gm/dL 12-16 years 12.0 gm/dL

Blood indices *1-Mean corpuscular volume (M.C.V)* $= \frac{\text{Haematocrite}}{\text{RBC number}} \times 100$	77-90 F.L (femto liter)	Used to DD B.W: Macrocytic anaemia >90 fl Normocytic anaenia 77-90 Microcytic anaemia <77 fl
2-Mean corpuscular haemoglobin (M.C.H) $= \frac{\text{Haemoglobin}}{\text{RBC number}} \times 100$	27-30 Pg (pico gram)	Used to DD B.W: Normochromic 27-30 pg Hypochromic<27 pg
3-Mean corpuscular haemoglobin Concentration (MCHC) $= \frac{\text{Haemoglobin}}{\text{Haematocrite}} \times 100$	32-35 gm/dl	
-Red cell distribution width(RDW)	13-16	-Up to 20 concides e iron deficiency anaemia -↑ 21suspect thalassemia
-Mentzer index $= \frac{\text{Mcv}}{\text{Rbc}}$		<13 iron deficiency anaemia >13 thalassemia

Anaemia

A-normocytic normochromic anaemia

→normal MCV &normal MCH

1-Hemolytic anaemia except thalassemia
2-Anaemin of acute blood loss
3- Anaemia with organs failure

B-microcytic hypochromic anaemia

→low MCV &low MCH

1-Iron deficiency anaemia
2-Thalassemia
3-Sidroblastic anaemia
4-Anaemia d t lead poisoning

C-*macrocytic anaemia*

→ high MCV

1-with ↓ vit B12 &Folic acid→megaloblastic anaemia
2-with normal vit B12 &Folic acid→mylodysblastic anaemia
Acquired sidroblastic
Mylophthisic syndromes

Iron deficiency anaemia

One of the most common types of anaemina world wide

Causes

1-↓ Intake----diet deficient in iron…..from dietetic history
2-↓ Absorption---malabsorption $....↑undigested food particles in stool analysis
or d.t constituents in diet that ↓iron absorption ……from dietetic history
3-↑ Loss----chronic blood loss e.g parasitic investation… in stool analysis
4-↑ Demand----during growth periods

c/p

1-General manifestations of anaemia

- -easy fatigue,palpitation,exertional dyspnea
- -Headache,dizziness,lack of concentration, Polyuria
- -pallor(in mucous membranes)
- -Hyperdynamic circulation…tachycardia,bounding pulse, Haemic murmur

2-Specific manifestations of iron ↓ anaemia

- -nails…brittle, flattened, loss of luster&spoonin
- -mouth….angular stomatitis,glossitis
- -neuro-psychiatric….picca(perverted appetite)e.gالثلج الطباشير دهان الحائط
- - ±spleenomegaly

3-Maifestation of cause

IX

1-CBC→hypochromic microcytic anaemia

- -↓haemoglobin <12gm/dl &haematocrite
- -↓MCV < 77 fl &MCH < 27 pg
- -↓ number of RBC

2-Biochemic→*mainly* to DD b.w iron↓anaemia &thalassemia

- -↓serum iron(n=70-140mcg%)
- -↓serum ferritin(n=1-30mcg%)
- -↓trasferrin saturation(n=30%)
- -↑TIBC(n=250-400mcg%)

-**The ferritin level**, is exquisitely **sensitive to inflammation,** increasing even with mild upper respiratory infections. Elevations of ferritin may persist for some time. **By contrast**, serum iron transferrin level, and percent transferrin saturation may decrease with infection or inflammation

3-Stool examination→parasits ,occult blood or malabsorption

Ttt

1-TTT of cause:

-parasitic investation.....**see git drugs**

-**correction of dietary faults:**

N.B

-Dietary iron__الاغذيه الغنيه بالحديد

Non heme iron	**Heme iron**
-has to be reduced to ferrous state Before absorption -absorption is affected by other costiteunts in diet -found mainly in **البلح---- سبع تمرات يوميا** **التفاح(الاخضر)--- بدون سلقه** **عسل اسمر--- من مصدركويس+طحينه** **السبانخ----- لكن فيها املاح اوكسالات عاليه** + عصير ليمون او برتقال Absorption ↑ by vit C e.g Civilline drops , Vitacid c eff tab absorption↓by tannat i.e ممنوع الشاى القهوة phosphate&phytate e.g cow milk,egg yolk,bread	-easily digested & rapidly absorped -absorption is not affected by other costiteunts in diet -found in foods of animal origin…. …1,5-6mg/100gm of diet **اللحوم والكبده**

Iron preparations *الادويه المحتويه على الحديد*

Drops→fer-in-sol drops

Syrup→K-G-ron(**15mg** iron/5ml) &Ferromix(**15mg** iron/5ml)

Sytron(**28mg** iron/5ml) & Vitaferrol(**38mg** iron/5ml)

Feose(**50mg** iron/5ml)

Tablet →theragran haematinic(**66mg/tab**) & ferose F (**100mg/tab**)

TTT for how long ? For 3-4 months

Hemolytic anaemia

Aetiology :

corpuscular

⇩ ⇩ ⇩

-Membrane defect
e.g spherocytosis

-HB defect
e.g thalasemia
sicle cell anaemia

-Enzyme defect
e.g G6pd ↓
pyruvate kinase↓

IX…peripheral blood smear
→spherocytes
…+ve osmotic fragility test

Glucose 6 phosphate dehydrogenase deficiency (G6pd ↓)

Aetiology &genetics

Hereditary x linked recessive genetic ↓of G6pd enzyme

Sex …. Fully expressed in hemizygous male &homozygous females
But can occur in heterozygous females

Age… at any age

Pathogenesis

-G6pd enzyme is responsible for production of reduced *NADPH* &renewal of Reduced *GLUTATHIONE*(GSH) which protect RBC from oxidants by reducig them

-so G6pd deficiency →↓ *NADPH*→↓ GSH →↓protection of RBC from oxidants

-so exposure of G6PD deficient RBC to an oxidant→oxidation of haemoglobin

-oxidized H.B is denaturated &deposetd as Heinz inclusion bodies on RBC

-membrane →↓ integrity of RBC →**haemolysis**

c/p

-History of exposure to triggering agent

Diet…..fava beans وكل ذوات الفلقتين

Drugs….antipyretics…all except paracetamol&mefenamic acid

Sulphonamides

Nitrofurans

Antimalarials

Antibiotics….chloramphenicol,nalidixic acid

Diseases…,viral URTI , DKA

-Maifestation of acute haemolysis

Acute pallor

Dark or cola colored urine

Jaundice

-Nausea , vomiting, abdominal pain

-Spleenomegaly in recurrent cases

IX

-CBC with reticulocytic count….↓ HB ,normal MCV & MCH (N N anaemia)

↑↑↑ of reticulocytic count

-↓↓ of G6PD level in RBC < 20 unit/10" RBC

-↑ serum bilirubin

N.B---SGPT&SGOT to exclude hepatitis

ttt

1-avoid exposure of triggering agent

2-*packed RBC transfusion* **= *defeciet* × *body weight* × *3*** (normal HB=12g%)

Sickle cell anaemia

Chronic haemolotic anaemia d.t hereditary disorder in which abnormal Hb is present→HbS[2α,2β]

Abnormal structure of β chain of Hb →valine replace glutamic acid in the 6th position of βchain

pathophysiolgy

Abnormal HB

⇓ when exposed to hypoxia

Polymerize and forms insoluble aggregate

⇓

RBCs become distorted and takes acharactristic sickle shape

⇓

Rigid non compressiple cells c↓ deformobility

⇓ Obstruction of small blood vessels

⇓ haemolysis [cell destruction]

c/p

-General manifestation of haemolytic anaemia
-Episodic crisis of 4 types:

Vasoocclusive (thrombotic or pinful) **crisis**

D.T→occlusion of small bl-vs→distal ischaemia&infraction

Clinically→according to site of occlusion:

-ishemic pain in hand&foot(**hand&foot $** or **dactylitis**)
-**acute abdomin**
-**cerebral stroke**&neurological sequellae
-renal infarction&papillary necrosis→hematuria
-**acute chest $**
-priapism
-splenic ifarction→**autosplenectomy**
-svere **back pain**
-**pain in long bone**→avascular necrosis of joints

TTT→

1-**adequqte hydration**→ by IV fluids
2-**analgesics**→Paracetamol or paracetamol+codeine(pyraphol supp)
Ibuprofen 10-15 mg/kg/dose
Morphine 0.1-0.2 mg/kg IV q4h; not to exceed 15 mg
Methadone .7mg/kg/day po/sc/im divided every 6-8h not to exceed10mg/dose
Nalpuphine(nuban) not in young infancy
3-O_2 inhalation
4-antibiotics→Cefruxime(zinnat) 50-100mg/kg/day every 12 hour
Ceftriaxone (cefaxone) 50-75g/kg/day every 24 hour
5-prolonged severe painful crisis→packed RBC transfusion
Partial exchange transfusion

N.B

1-**painful crisis affecting long bone**…….Do x ray to exclude osteomlitis
AB is very important

2-**in cerebral stroke**→never to give blood

3-**in periapism**→sustained unwanted painful erection
if prolonged more than 2hour Interfere by:
aspiration of blood
Intracorporal injection of adrenalin
Irrigation by cold saline

<u>spleic sequestration crisis</u>

D.T→sudden pooling of large amount of blood in spleen&liver

clinically→rapidlly enlarged abdomen
massive splenomegaly
sudden circulatory collapse

TTT→
- ttt of hopovolaemic shock
- packed RBC transfusion to raise HB to 10gm% only if HB < 7gm%

<u>Aplastic crisis</u>

D.T →sudden attack of transient bone marrow failure usually following infection

Clinically→-sudden onset of severe anaemia . Hemoglobin may fall as much as 10-15% per day without reticulocytosis
-last for 10-14 day
-CBC…..anaemia or pancytopenia with normal or low reticulocytic count

TTT→immediate blood transfusion to raise HB up to 10 gm%

<u>hyperhemolytic crisis</u>

uncommon ,
acute haemolytic crisis with jaundice , pallor, dark urine

Thalassemia

Genetics&pathogenesis

- Normal HB is made up of 4 polypeptide chain →2 α & 2 non α
- Synthesis of α globin chain is controlled by 4 genes ,while β chains Is controlled by 2 genes

HB	Polypeptide chain	% at birth	% at 6 months
1-fetal HB(HBf)	2 α +2gamma	65%	2%
2-adult 1 HB (HBA1)	2 α +2 β	34%	95%
3-adult 2 HB (HBA2)	2 α +2 delta	< 1%	3%

-in β thalassemia →there is impaired production of beta globin chain due to Deletion of one or both genes controlling its production i.e there is decreased Production of β chains with normal production of α chain →this result In relative excess of α chain which precipitate in RBC as inclusion bodies →rigidity & destruction of RBC

-in α talassemia → there is impaired production of α globin chain due to Deletion of one or more genes responsible of its production

Types of thalassemia

***1-α* thalassemia** :

Genetic deletion can affect one or more genes controlling α chain synyhesis

Deletion of 4 genes………hydrop fetalis

Deletion of 3 genes…haemoglobin H disease(c/p as β thalassemia major)

Deletion of 2 genes….. α thalassemia trait(c/p as β thalassemia minor)

Deletion of 4 genes………sileny carrier

2-**β thalassemia:**

1-Minor type

heterogenous β thalassemia

HB A_1 is predominant,HB A_2 ↑ > 4% , HB f may slightly ↑

Anaemia is mild….9-11gm%

2-*Intermediate type*

Affect 2% of homozygous patients

Patient has higher ability to produce β chain(more than in major type)

Genetics,morphology,biochemical features like β thalassemia major

Blood transfusion not needed routinely

3-*Major type*

Homozygous β thalassemia

HB f predominas

Blood transfusion needed routinely

Clinical features

1-general manifestation of anaemia→see iron defeciecy anaemia

2-general maifrstations of ↑ haemolysis→jaundice,dark stool.dark urine

3-maifrstations of ↑ medullary erythropoiesis→thalassemic facies

thalassemic facies →enlarged head, frontal&parietal bossing
protruded maxilla, depressed nasal bridge
slantig of eye&epicathic folds

4-maifrstations of ↑ extramedullary erythropoiesis→
hepatomegaly &spleenomegaly
lymphadenopathy

5-growth retardation

6-mainfestations of complications→
Haemosidrosis
2ry hyersplenism
Comx of blood transfusion

Investigations

1-CBC→micricytic hypochromic anaemia(↓HB, ↓MCV, ↓MCH)
↑ reticulocytic count
Lymphocytosis & leukocytosis usually present
RDW → ↑
Mentzer index→↑
Target cells, anisocytosis

2-Biochemical studies→
↑ Serum iron, ↑ Serum ferirtin
HB electropheresis…..need skilled technician
→ ↑ HB f = thalassemia major
→↑ HB A_2 = thalassemia minor

N.B

HPLC = high performance chromatography
A more accurate substitute for HB electropheresis in diagnosis thalassemia

Treatment

1-Packed RBC transfusion:
According to the following equation→**defeciet × body weight ×3**
Every 3 cm packed RBC ↑ HB 1gm/kg
Consider normal HB =12 gm/dl

2-Iron chelating agents

a-arentral→desferoxamine
dose----30-40mg/kg/day s.c, im, iv
or iv infusion in a rate 12-15mg/kg/h over 12 hours

b-Oral→deferasirox(Exjade)
dose---20mg/kg/day oral on empty stomach
or 30 min before meal
----calculate dose to the nearest whole tablet
Dissolve tablet in water or juice &drink immediately
---- maintenance dose….5-10mg/kg/day
----adjust dose every 3-6 months not to exceed 30mg/kg/day

N.B

Diet: Drinking tea with meals reduces dietary iron absorption

3- folic acid………1-5mg/day

4-antibiotic………erythromycin or long acting pencillin /3 weeks

5-vaccination…….pueumococci,meningococci,haemophilus influenza

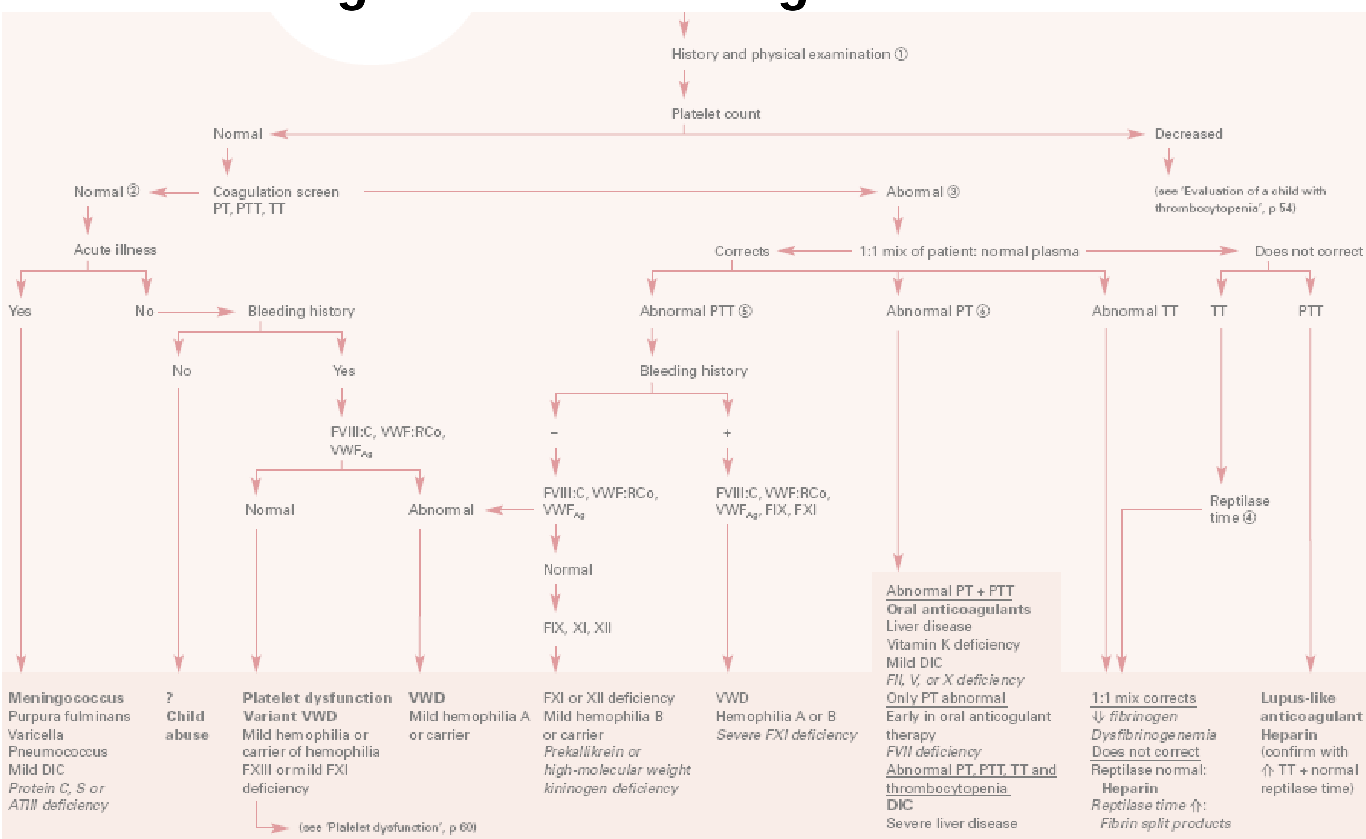
6-lasix 1mg/kg/dose following blood transfusion(to avoid volume over load)

7-CST

8-bone marrow transplantation….is the only radical treatment

Bleeding disorders

Evaluation of a child with bleeding or abnormal coagulation screening tests



Bleeding time prolonged→platelet or vascular disorder
Coagulation time prolonged→ Coagulation factor defect

Haemophilia

Types

1-haemophilia A→ ↓ factor 8 most common
2- haemophilia B→↓ factor 9
3- haemophilia C→↓ factor 11

C/p

------------------ **bleeding tendency :**
-prolonged bleeding after minor trauma,circumcision or spontaneous
-hemoarthrosis→limping & pseudoparalysis my be recurrent leading to Ankylosis of joint
-Ecchymosis
-Haematuria
-M M bleeding
-dangerous sites→intrscranial,intraocular,retroperitoneal haemorrhage

Ix

-BT , PT→ normal
-PTT →prolonged
-factor 8 assay→ ↓

Ttt

1-**prevent bleeding**….avoid IM injections ,violent excercises,aspirin
2-**local measures to arrest bleeding**….presure, cold compresses, immobilization
3-**replacement therapy….**
Preparations …..Fresh frozen plasma→every 1ml contain 1 unit of factor 8
cryoprecipitate→each bag cotain 125 unit of factor 8
factor 8 concentrate→250 or 500 unit/ vial
Dose…………..25 unit/kg/12h…. for usual hemarthrosis
25-50unit/kg/12h….for GIT or hematuria
50-75unit/kg/8h….for CNS bleeding
4-**antibiotic**→especially antistaph especially in haemoarthrosis

CNS

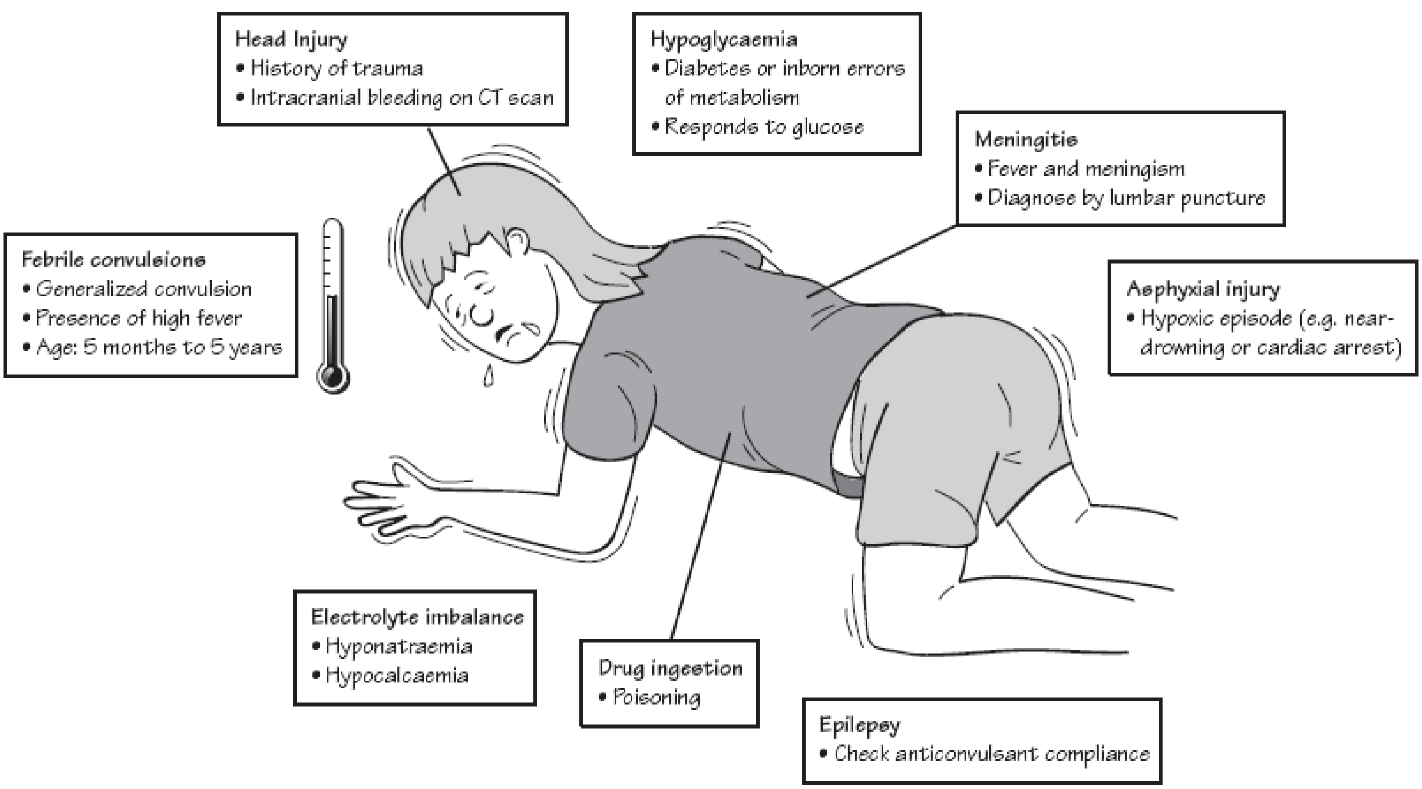
CNS

Convulsion

Definition:

Seizure is a sudden, transient disturbance of brain function, manifested by involuntary motor, sensory, autonomic, or psychic phenomena, alone or in any combination, often accompanied by alteration or loss of consciousness. Seizures can be caused by any factor that disturbs brain function. They may occur after a metabolic, traumatic, anoxic, or infectious insult to the brain (classified as remote symptomatic seizures), or spontaneously without prior known CNS insult. Repeated seizures without evident acute symptomatic cause (eg, fever) are defined as **epilepsy**.

Causes of convulsions



Causes:

1 – **Acute symptomatic or <u>provoked</u>**:

- ❖ **With fever:**
  1 – Febrile seizures due to infections outside CNS.
  2 – Intracranial infection meningitis, encephalitis, brain abscess, subdural or extradural.
  Abscess, septic venous thrombosis
- ❖ **Without fever**:

  1 – Traumatic:
  -brain concusion ,contusion , intracranial haemorrhage.
  2 – Toxic:
  -exogenous→tetanus, shigellosis, aminophylline , antihistaminics lead.
  -endogenous→uremia , hepatic failure , DKA
  3 – Hypoxic:
  -cardiac arrest , near drowning , acute vascular collapse
  4 – Metabolic:
  -hypoglycemia, hypocalcemia, hypomagnesemia, hypo&hypernatremia
  5 – Vascular:
  -hypertensive encephalopathy, cerebral strokes

2 – Epilepsy (chronic or recurrent <u>unprovoked</u> convulsion) see the definition

Febrile convulsion

Cause → rapid rise of body tempreture due to infections outside CNS
Criteria → 5 criteria **must be** present (**all of them**) for diagnosis:

1 – age…..6 months till 5 years old
2 – fever...rapid rise of body tempreture ,
3 – convulsion:
  onset within 8-12 hour of onset of fever
  type generalized tonic clonic i.e. (**الولد جسمه خشب وبعدين بدأ يتنفض**)
  Duration less than 15 min
  Postictal stupor is short
  Frequency one fit during same illness
4 – normal neurological evaluation
5 – evidence of extracranial infectionmost common causes are
  o.m , tonsillitis , UTI , G.E

N.B EEG are not routinely recommended except:
1- +ve family history of epilepsy
2- previous neurological illness
3- atypical presentation(**اختلال احد الشروط**)e.g nofever ,prolonged ,focal
EEG if indicated, it should be **made only after at least 2 week** from last fit

ttt→a – **if during fit of convulsion**:
1-emergency rescutation……A B C
2-termination of attack of convulsion……neural ,3mg/kg IV or ,5mg/kg rectal
3- + as below

b – **if after attack of convulsion:**
1-lowering body tempreture…..tepid sponging + antipyretics(e.g cetal supp)
2-ttt of cause of fever…..e.g antibiotic for O.M
3-exclusion of intracranial infection

– **Prolonged anticonvulsant prophylaxis** for preventing recurrent febrile convulsions is controversial and no longer recommended for most children
– **If parental anxiety** is very high, oral diazepam may be used as an effective and safe method of reducing the risk of recurrence of febrile seizures. At the onset of each febrile

illness, **oral diazepam**, 0.3 mg/kg q8h (1 mg/kg/24 hr), is administered for the duration of the illness (usually 2–3 days).

CNS INFECTIONS

1–**Encephalitis:**

Causes→

- viral infection…..enterovirus , varicella ,EBV or herpes
- allergic reaction following infection…post infectious demylinating encephalitis e.g mumps
- allergic reaction following vaccination…..pertussis ,influenza

N.B---mycoplasma encephalitis usually preceeded by lobar pneumonia

Clinically→

- history of preceeding viral infection(e.g URTI) , vaccination or mycoplasma pneumonia
- fever followed by drowsiness , bizzar behaviour or deep coma(early)
- convulsion &↑intracranial pressure(late in encephalitis early e meningioencephalitis)

I.X. →

CSF findings……see meningitis
CT&MRI…….may show swelling of brain parenchyma
EEG

TTT→

supportive→this the main ttt …….antipyretics , control of convulsion , rest , iv fluids
antibiotics→although mostly viral broad spectrum AB must be given until CSF results
ceftriaxone OR ceftazidime 100mg/kg/day OR
cefotaxime OR cefoperazone 200mg/kg/day
+ampicillin 300mglkg/day
In herpitic encephalitis……acyclovir 10mg/kg/dose IV over1hour every 8h
e.g zovirax vial 250mg/5ml

2–**MENINGITIS:**

Causes→

- neonates…grm-ve enteric flora(e.coli) , group B streptococci ,listeria , staphylococcus
- infancy……Hemophilus influenza type B , pneumococcus , meningococcus
- older children…… meningococci is more common
- other organisms **include**…….pseudomonas , proteus , klebsiella

Clinically→

- **onset**…may be rapid (as with meningococci& pneumococc) or subacute(with H.influenza)
- **signs of meningeal irritation:**
  In small infant….irritability , restleeness , poor feeding
  In older children…..photophopia , headache , irritability

  + **1- neck stiffness….ازاى؟**

  تنيم الولد على سرير الكشف بحيث تكون الرأس خارج حافه السرير ومش سانده على حاجهوتشوف فيه اى صعوبه فى تحريك الراس للامام ولا لأ

  Grades of neck stiffness….guarding ,rigidity ,hyperextension

  2-back signs…..back pain, tripod sign(sit unsupported on the buttocks&ul),opisthotonos

  3-kernigs sign…inability to extend the knee with hip flexed

  4-brudzinski sign…..head flextion→leg flextion(head to leg sign)
  Flextion of one leg→ Flextion of the other leg(leg to leg)
- **signs&symptoms of ↑ intracranial pressure:**
  In small infant…bulging anterior fontanel ,cracked pot percussion note over the skull
  In older children…..headache ,projectile vomiting , blurring of vision,photophopia
  In any age……irregular respiration , ↑ blood pressure , slow pulse
- **other findings:**
  Fever (may be abscent)
  Changes in sensorium vary from **mild lethargy to coma**
  Convulsions(common &early)
  Focal neurological signs
  Purpuric rash =meningococcemia

I.X. →

1-lumbar pucture

Cerebrospinal Fluid Findings in Various Central Nervous System Disorders

Condition	Pressure	Leukocytes (/µL)	Protein (mg/dL)	Glucose (mg/dL)	Comments
Normal	50-180 mm H_2O	<4; 60-70% lymphocytes, 30-40% monocytes, 1-3% neutrophils	20-45	>50 or 75% blood glucose	
Acute bacterial meningitis	Usually elevated	100-60,000+; usually a few thousand; PMNs predominate	100-500	Depressed compared with blood glucose; usually <40	Organism may be seen on Gram stain and recovered by culture
Partially treated bacterial meningitis	Normal or elevated	1-10,000; PMNs usual but mononuclear cells may predominate if pretreated for extended period	>100	Depressed or normal	Organisms may be seen; pretreatment may render CSF sterile in pneumococcal and meningococcal disease, but antigen may be detected
Tuberculous meningitis	Usually elevated; may be low because of CSF block in advanced stages	10-500; PMNs early but lymphocytes and monocytes predominate later	100-500; may be higher in presence of CSF block	<50 usual; decreases with time if treatment not provided	Acid-fast organisms may be seen on smear; organism can be recovered in culture or by PCR; PPD, chest x-ray positive
Fungal	Usually elevated	25-500; PMNs early; mononuclear cells predominate later	20-500	<50; decreases with time if treatment not provided	Budding yeast may be seen; organism may be recovered in culture; India ink preparation or antigen may be positive in cryptococcal disease
Viral meningitis or meningoencephalitis	Normal or slightly elevated	PMNs early; mononuclear cells predominate later; rarely more than 1000 cells except in eastern equine	20-100	Generally normal; may be depressed to 40 in some viral diseases (15-20% of mumps)	Enteroviruses may be recovered from CSF by appropriate viral cultures or PCR; HSV by PCR
Abscess (parameningeal infection)	Normal or elevated	0-100 PMNs unless rupture into CSF	20-200	Normal	Profile may be completely normal

HSV, herpes simplex virus; PCR, polymerase chain reaction; PMNs, polymorphonuclear leukocytes; PPD, purified protein derivative of tuberculin.

2-CBC
3-blood culture
4-CT in presence of focal signs

TTT →

1 - **supportive**…. antipyretics , control of convulsion , rest , iv fluids

2 - **ANTIBIOTICS**→emprical(baed on common etiologist)

ceftriaxone OR ceftazidime 100mg/kg/day OR
cefotaxime OR cefoperazone 200mg/kg/day
\+ ampicillin 300mglkg/day OR
Unictam OR augmentin

N.B…chloramphenicol 100mg/kg/day in patients sensitive to cephalosporines
Adjust the ttt regimen according to results of culture

Duration of ttt 10-**14 day in neoborn 3weeks** CSF must become normal &sterile

-Use of CST…..

Use of dexamethasone for ashort period early in the disease(under good cover of AB)
May reduce the incidence of neurological complications
Dose at 0.15 mg/kg q6h for 2-4 days.

Short notes on epilepsy

- **Epilepsy is** considered to be present when 2 or more unprovoked seizures occur At an interval greater htan 24 hours apart

-Epilepsy is classified

A) Partial seizures:

1) Simple partial
   Motor, sensory , autonomic , psychic
2) Complex partial
   • Simple partial, followed by impaired consciousness.
   • Consciousness impaired at onset.
3) Partial seizures with secondary generalization.

b) Generalized seizures

1) Absences: - Typical , Atypical.
2) Generalized tonic clonic.
3) Tonic.
4) Clonic.
5) Myoclonic.
6) Atonic.
7) Infantile spasms.

C) Unclassified seizures.

Treatment of epilepsy:

1-General measurement→parentral worries about prognosis ,present &future life style, education , marriage ,pregnancy should be discussed and clarified

2-During attack of convulsion

a-first aid(emergency resuscitation) →should be done in every case regardless of seizure Duration and should be taught to parents so they can do it at home:

-put in left lateral position
-extend the neck / elevate the jaw
-remove tight clothes/donot restrain
-nothing per mouth (even tongue depressor)
-no mouth to mouth breathing

b-suction&cleaning→an oropharyngeal air way may be needed

c-give 0_2 if patient is cyanosed or convulsing >2min

d-emergency drugs→the drug of choice diazepam .3mg/kg/dose(10mg/2ml) slowly IV can be repeated after 10 min
if convulsion stop during injection stop injection
if no venous access the same dose can be given rectally by insulin syring(without needle)

3-Long term therapy:

-**When to start?**→anti-epiletic drug is started usually after 2nd afebrile attack

Ques -Should treatment with antiepileptic drugs be started after the first seizure in a child?
Answer-"Delaying" treatment until after the second seizure does not adversely affect the long-term chance of epilepsy remission

-How to start?→perferlably use one drug only(**monotherapy**) on the lowest dose that control condition
if **polytherapy** ensure that used drugs are compatible with each other

-Which drug ? →

-**Phenobarbital**
Dose……..3-8mg/kg/day
Preparation……sominaletta syrup 15mg/5ml
Tablet 15mg/tab
Amp 40mg/ml

- Pheytoin
Dose……...10-15mg/kg/day
Preparation….epanutin amp 250mg/5ml
Epanutin susp 30mg/5ml

-**Carbamazepine**
Dose….10-20mg/kg/day
Preparations……tegretol susp 100mg/5ml & tab 200mg/tab
Tegretol CR 200&400mg/cap

-**valproic acid**
Dose……20-30mg/kg/day
Preparation… convulex drops 300mg/ml (10mg/drop) &cap 150-300m/cap
Depakine syrup 200mg/5ml &tab 200mg

-clonazepam
dose……. ,05-,1mg/kg/day
preparation…….rivortil- apetryl-amotryl tablet ,5mg&2mg/tab
Rivortil drops ,1mg/drop

In generalized epilepsy………..valproate &cabamazepine
In petit mal epilepsy…………...clonazepam&valproate

-**How much and how often?** → 1-the smallest dose to keep the child fit free
2-give the drug in two or three doses per day

-**For how long?**→ttt lasts until the patient is seizure free for 2 years then the drug is withdrawn Very gradually over 3 months

-**Restriction**→ generally no restrictions in food ,sports,beverage

Common Anticonvulsant Drugs(NTP 18)

DRUG	SEIZURE TYPE	ORAL DOSE	LOADING DOSE (IV)	THERAPEUTIC SERUM LEVEL (µG/ML)	SIDE EFFECTS AND TOXICITY
Carbamazepine (Tegretol)	Generalized tonic-clonic Partial	Begin 10 mg/kg/24 hr Increase to 20–30 mg/kg/24 hr tid	—	8–12	Dizziness, drowsiness, diplopia, liver dysfunction, anemia, neutropenia, SIADH, blood dyscrasias rare, hepatotoxic effects
Clobazam (Frisium)	Adjunctive therapy when seizures poorly controlled	0.25–1 mg/kg/24 hr bid or tid	—	—	Dizziness, fatigue, weight gain, ataxia and behavior problems
Clonazepam (Rivotril)	Absence	Children <30 kg: Begin 0.05 mg/kg/24 hr	—	>0.013	Drowiness, irritability, agitation, behavioral abnormalities, depression, excessive salivation
	Myoclonic	Increase by 0.05 mg/kg/wk			
	Infantile spasms	Maximum 0.2 mg/kg/24 hr bid or tid			
	Partial	Children >30 kg: 1.5 mg/kg/24 hr tid, not to exceed 20 mg/24 hr			
	Lennox-Gastaut				
	Akinetic				
Ethosuximide (Zarontin)	Absence	Begin 20 mg/kg/24 hr	—	40–100	Abdominal discomfort, skin rash, liver dysfunction, leukopenia
	May increase tonic-clonic seizures	Increase to maximum of 40 mg/kg/24 hr or 1.5 g/24 hr, whichever is less			
Gabapentin (Neurontin)	Adjuntive therapy when	Children: 20–50 mg/kg/24 hr tid	—	Not necessary to monitor	Somnolence, dizziness, ataxia,

DRUG	SEIZURE TYPE	ORAL DOSE	LOADING DOSE (IV)	THERAPEUTIC SERUM LEVEL (μG/ML)	SIDE EFFECTS AND TOXICITY
	seizures poorly controlled	Adolescence: 900–3,600 mg/24 hr tid			headache, tremor, vomiting, nystagmus, fatigue and weight gain
Lamotrigine (Lamictal)	Adjunctive therapy when seizures poorly controlled	Individualized based on age and additional anticonvulsants (see Chapter 593.6)	—	—	Rash, dizziness, ataxia, somolence, diplopia, headache, nausea, vomiting
	Broad-spectrum anticonvulsant activity in various seizure types including: complex partial, absence, myoclonic, clonic, tonic-clonic, and Lennox-Gastaut				
Nitrazepam (Mogadon)	Absence	Begin 0.2 mg/kg/24 hr	—	—	Similar to clonazepam, hallucinations
	Myoclonic Infantile spasms	Increase slowly to 1 mg/kg/24 hr tid			
Paraldehyde	Generalized status epilepticus	Make a 5% solution by adding 1.75 mL of paraldehyde to D5W with total volume of 35 mL	150–200 mg/kg Maintenance, 20 mg/kg/hr	10–40	
Phenobarbital	Generalized tonic-clonic	3–5 mg/kg/24 hr bid	20 mg/kg	15–40	Hyperactivity, irritability, short attention span, temper tantrums, altered sleep pattern, Stevens-Johnson syndrome, depression of
	Partial		20–30 mg/kg in the neonate		
	Status epilepticus				

DRUG	SEIZURE TYPE	ORAL DOSE	LOADING DOSE (IV)	THERAPEUTIC SERUM LEVEL (μG/ML)	SIDE EFFECTS AND TOXICITY
					cognitive function
Phenytoin (Dilantin)	Generalized tonic-clonic	3–9 mg/kg/24 hr bid	20 mg/kg	10–20	Hirsutism, gum hypertrophy, ataxia, skin rash, Stevens-Johnson sydrome, nystagmus, nausea, vomiting, drowsiness, coarsening facial features, blood dyscrasias
	Partial				
	Status epilepticus				
Primidone (Mysoline)	Generalized tonic-clonic	Children <8 yr: 10–25 mg/kg/24 hr tid or qid	—	5–12	Aggressive behavior, personality changes, similar to phenobarbital
	Partial	Children >8 yr: usual maintenance dose, 750–1,500 mg/24 hr tid or qid			
Topiramate (Topimax)	Adjunctive therapy for poorly controlled seizures	1–9 mg/kg/24 hr bid	—	—	Fatigue, cognitive depression
	Refractory complex partial seizures				
Tiagabine (Gabitril)	Adjunctive therapy for complex partial seizures	Average dose, 6 mg tid	—	—	Asthenia, dizziness, poor attention span, nervousness, tremor
Valproic acid (Depakene, Epival)	Generalized tonic-clonic	Begin 10 mg/kg/24 hr	Intravenous preparation now available Studies in children under	50–100	Nausea, vomiting, anorexia, amenorrhea, sedation, tremor,
	Absence	Increase by 5–10 mg/kg/wk			
	Myoclonic	Usual dose, 30–			

DRUG	SEIZURE TYPE	ORAL DOSE	LOADING DOSE (IV)	THERAPEUTIC SERUM LEVEL (μG/ML)	SIDE EFFECTS AND TOXICITY
		60 mg/kg/24 hr tid or qid	way		weight gain, alopecia, hepatotoxicity
	Partial				
	Akinetic				
Vigabatrin (Sabril)	Infantile spasms	Begin 30 mg/kg/24 hr once daily or bid	—	—	Hyperactivity, agitation, excitement, somnolence, weight gain
	Adjunctive therapy for poorly controlled seizures	Maintenance dose, 30–100 mg/kg/24 hr once daily or bid			Note: Reports of visual field constriction, optic pallor or atrophy, and optic neuritis

SIADH, syndrome of inappropriate secretion of antidiuretic hormone.

Should an EEG be done on all children who have a first afebrile seizure?

This is a major controversial issue. Of new-onset seizures in children, about one third do not involve fever. The American Academy of Neurology has recommended that all children with a first seizure without fever undergo an EEG in an effort to better classify the epilepsy syndrome. Others argue that the quantity of expected information from obtaining EEGs for all cases is too low to affect treatment recommendations in most patients. They suggest that a selective approach to EEG use should be pursued, particularly for children with a seizure of focal onset, for children <1 year old, and for any child with unexplained cognitive or motor dysfunction or abnormalities on neurologic examination.

Should all children with a new-onset afebrile generalized seizure have a CT or MRI evaluation?

Although most adults with new-onset seizures should have a head imaging study (preferably MRI), the relatively high frequency of idiopathic seizure disorders in children often obviates a scan in those with generalized seizures, nonfocal EEGs, and normal neurologic examinations. Consider obtaining a cranial imaging study in the following situations:

- Any seizure with focal components (other than mere eye deviation)
- Newborns and young infants with seizures
- Status epilepticus at any age
- Focal slowing or focal paroxysmal activity on EEG

GULLIAN-BARRE' SYNDROME

Icidence→most common cause of acute paralysis in pediatric age group

Cause→

It usually follow viral infection (hence the name post infectious poly neuritis) sensitized lymphocytes cause demylination of the peripheral nerves mainly at junction of anterior & posterior nerve roots(spinal nerves).

The damage is **mainly motor**

Clinically→

1- **motor manifestations(predominat):**bilateral symmetrical weakness begins usually in the lower limb &progress to involve the trunk ,upper limbs & finally the bulbar muscles→Repiratory paralysis(**ascending paralysis e bilateral total distal areflexia**)
2- sensory mainfestation→tender muscles &paraethesia in some cases
3- autonomic maifestation→ in some cases urinary incontinence or retention , postural hypotension

I.X. →

1-CSF……..**protein cell dissociation(↑protein ,normal cell)**

2-nerve conduction pattern**…..decreased**

3-EMG….**denervation pattern**

4-serum CPK…….normal

TTT→

1- **supportive….**in acute phase the patient must be hospitalized as patient may need mechanical Ventilation

2- **specific** ……. One of following ttts OR both

a-**IV immunoglobulin** 0.4 g/kg/d IV for 5 d

b-plasma exchange five exchanges of 50mg/kg/day over 7-10 days

3-**physiotherapy**…….to restore normal function

Status epilepticus

It is→astate of continuous epileptic activity(clinical& / or EEG)for 30 min or more and/or serial attacks without return of consciousness in between for 30 min or more

Management→ better **in ICU** . **steps:** A→B→C→D→E

A- airway………establish apatent oral airway by suction,semiprone oosition± put oropharyngeal airway tube

B- breathing 1-give 100% O_2 by mask , or ambu bag
2-If needed assisted ventilation
3-Intiatevpulse oximetry to maintain o2 saturation

C-circulation… 1-asses pulse , BL.P ,rectal tempreture
2-insert IV line . draw blood samples for blood glucose,electrolytes,bicarbonate level CBC , anticonvulsant drug level(if on ttt)
3-start drip of glucose 10% as 2ml/kg , shock therapy if shocked Then IV fluids giving 2/3 of daily maintenance requirements
4-ABG measurement

D-DRUGS………

Stage 1→ 0-5 min no drugs

Stage 2→6-16 min

First line drugs: a benzodiazepine

a- **Diazepam(neural 10mg/2ml)**→
,3mg/kg/dose slowly IV
,5 mg/kg/dose rectally by insulin syring(without needle) Can be repeated after 5 min

b- **Lorazepam**→Lorazepam, when available, is thought to be the most effective and has a longer seizure half-life than diazepam.
Dose… infants and children: 0.1 mg/kg IV slowly over 2-5 min; repeat prn in 10-15 min at 0.05 mg/kg; not to exceed 4 mg/dose

c- **Midazolam→**

Loading dose: 0.15 mg/kg IV

Maintenance dose: 1 mcg/kg/min; titrate dose upward q5min until clinical seizure activity controlled

Stage 3→16-35 min

second line drugs phenytoin sodium or fosphenytoin

-Phenytoin…….

Loading dose: 18-20 mg/kg IV; hypotension may necessitate slowing administration rate; rate not to exceed 50 mg/min (hypotension and arrhythmias can otherwise occur); if status epilepticus persists, may increase to total of 30 mg/kg

-Barbiturates………15-20 mg/kg over 10-15 min IV in single or divided dose

-Midazolam

N.B **After intial control of convulsions**….

A maintenance dose of Phenobarbital(2-3mg/kg/dose iv /8-12h)

± phenytoin(2-3mg/kg/dose iv /8-12h)

May be needed for 1-2 days to prevent recurrence

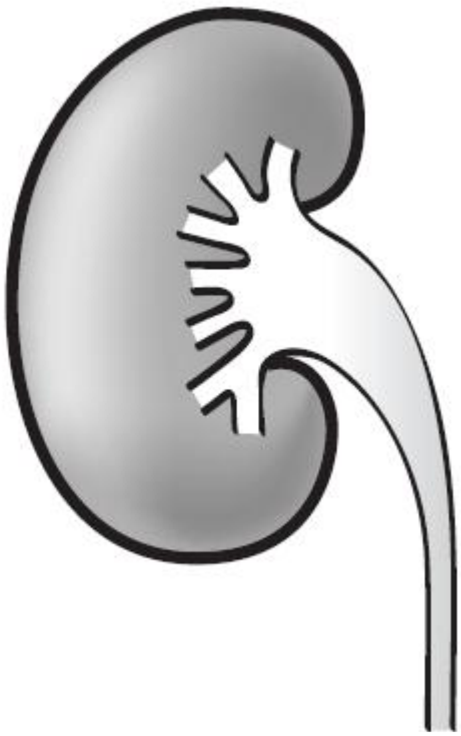
Stage 4→ >35 min

Midazolam: ,1mg/kg/hour (1 ml dormicum+100 saline infusion at arare of 2ml/kg/h)

Pancuronium :,1mg/kg IV entubation then mechanical ventilation

Thiopental: 2-4mg/kg IV followed by constant infusion 2mg/kg/hour for 48 hour

Renal System



Urinary system

Urine analysis

How to obtain urine sample in pediatric?

1-mid sream clean catch…..in older children wirh urinary Control i.e. i.e.who can Void on request

2-sterile urine bag…...in infants&young children who can not void on request

3-catheter →

4-subrapubic aspiration → the ideal way to obtain sample

N.B sterile bag

هو كيس اخذ عينه بول فى الاطفال وهو مختلف تماما عن كيس تجميع البول الذى يركب فى القسطرة

A-Physical properties		Comment
1-aspect	Clear	Turbid----contaminated container, pyuria,crystaluria
2-colour	Amber yellow	Deep yellow to orange--- concentrated urine(dehdration) Bilirubin(hepatitis) Foods …carrot Drugs..vit c&B Pink to red------haematuria,HB uria Foods..البنجر+التوت Drugs..rifampicine , Metronidazole Brown urine(tea colored)----haematoria of renal Origin
3-PH	Acidic Average 6	Alkaline -----haematuria , uti with proteus, Renal tubular acidosis

4-volume	1,5-3.5ml/kg/h	Oliguria if<1ml/kg/h(400ml/m"/day)
5-specific gravity	1010-1020	↑with concentrated urine eg:dehydration, Glucosuria,prtnuria ↓with renal faiure, diabetes insipedus
B-Biochemical Propertertes		
Ptotein		Proteinuria--- >150mg/24H Mild…..150-500mg/24h Moderate..500-2000mg/day severe…>2000mg/day
Urobilinogen	Traces	↑ with hepatic jaundice(hepatitis A) Bile pigments normally abscent It appear with hepatic&obstructive Jaundice
Glucose	Nil	

C- MICROSCOPIC PROPERTIES **CELL** 1-R.B.C	0-5 cell/h.p.f	Haematuria if > 5 N.B.mild haematuria Occur with Uti
2-W.BC(pus cells)	0-5 cell/h.p.f	↑ with pyuria
3-Epithelial cells		↑ with vaginal candidiasis **c/p**:dysuria, ithing,discharge **ix**: urine analysis--- ↑ epith cells **ttt**:topozol v cream twice/day for one wek Put afilm of cream bt labia majora متستعملش المبسم اللى مع الكريم

Crystals

A-urate

1-dietary management

ممنوع البنات ؟شاى-القهوة-الكوكاكولا- العرقسوس الكاكاو-1

تقليل تناول الأغذية الغنية بالبيورين مثل : الكبدة و المخ و الكلاوى و السردين -2
و الانشوجه و عيش الغراب و اللحوم المفرومة الجاهزة و اللحوم و الدواجن و الأسماك و القشريات

2-↑fluid intake

3- drugs:

Urosolvin eff sachet 1/2 -1 sachet twice daily
Uricol eff sachet 1/2-1 sachet twice daily

N.B.....colchicine is contraindicated < 2 years

B-oxalate

1- Dietary management

الإمتناع عن تناول الأغذية المحتوية على أعلى تركيز أوكسالات-1
و التى تحتوى الوحدة منها على 125 ملليجرام او أكثر من الأوكسالات و هى **: السبانخ**
خضارالسلق المطبوخ ، البنجر المخلل ، مخبوزات فول الصويا ، الفول السودانى ، **البامية**
الشيكولاتة .

تقليل تناول الأغذية المحتوية على تركيز مرتفع نسبياً من الأوكسالات مع عدم وضع أكثر-2
من نوع منها فى الوجبة الواحدة ، مثل : البقدونس ، الكرات ، البطاطا الحلوه ، الكاكاو الباذنجان
البقول الخضراء أو الجافة (المطبوخة فى صلصة الطماطم) ، الفلفل الأسود ، الكرفس ، الفلفل الأخضر
، **و الفراولة** .

الإعتدال فى تناول الشاى لإحتوائة على تركيز مرتفع من الأوكسالات ، فيجب معرفة أن - 3
الكوب الواحد منه ، عندما ينقع فية الشاى لمدة دقيقتين تكون كمية الأوكسالت 55 ملليجراماً
و 4 دقائق تكون 70 ملليجرام ، 6 دقائق تصبح 80 ملليجراماً ، و لذلك يفضل إستخدام
الشاى الباكت و لا يتم غلى الشاى فى الماء طبعا ولايترك فى الكوب اكثر من 2 ددقيقه

2-↑fluid intake

3-drugs

Epimag eff sachet
Citrocid mg plus eff sachet
Dose--------<2 year 1/2 sachet twice daily
>2 year 1 sachet twice daily

c-phosphate

acidification of urine by vit c(vitacid c eff tab) -----,5-1 Gm/day

casts	1-W.B.C cast-----with pyelonephritis 2-granular casts -----also with pyelonephritis 3-Hyaline casts----normal or with nephritic $ 4-Rbc casts----G.N 5-lipoid casts------ nephritic $

Urinary tract infection

Incidence: uti is acommon infection in pediatrics especially females d.t.
Short urethra
In newborn&young children(<2 years) male to female incidence
Is equal

Aetiology: E-COLI responsible for 80-90%of cases
Other organisms→proteus-klebseilla-pseudomonas
GRAM +ve organisms can cause uti →blood born infection from
Distant septic focus

C/p : commonly asymptomatic
When symptoms appear they are no specific&not related to uriary system
i.e. **uti need to be in mind to be diagnosed**

lower uti	*Upper uti*
Mainly local manifestation →in infants -low grade fever -crying or discomfort with Urination -foul smelling of urine →in older children -dysuria -suprapubic pain -frequency,urgency,hesitancy -incontinence….common -no or low grade fever	Mainly systemic manifestation -high fever -rigor √ -vomitting √√ -pain in flanks

Investigations

1-urine analysis:

Pus cells--->5 cell/hpf
Rbc-----may ↑ d.t. congestion

2-C.B.C: leukocytosis

3-Urine culture :**when?**

Scientifically in every case before start of antibiotic therapy
But….**practically** ...if pus cells > **20** or in recurrent uti

4-kidney function tests: in prolonged or recurrent cases

N.B

1- sing&symptoms of uti are present but no pus cells in urine analysis!?
Suspect perinephric abscess

2-low pus cell count in urine analysis which donot concides e severe c/p…
Suspect presence of obstructive uropathy

3-pus cells are present in urine but no growth in culture!?
This is sterile pyuria which occur with T.B, Chlamydia,mycoplasm

N.B **Recurrent uti**

<u>Occur In (precipitating factor):</u>

1-vesicouretric reflux
2-constipation→the dilated rectum compress the bladder
And cause voiding dysfunction
3-obstructive uropathy e.g.posterior urethral valve
4-inadequate ttt of attacks of uti
5-urinary caliculi
√√ 6-bad toilet hygein especially youg females i.e
Back to front washing→seeding vagina e microorganisms from stool

<u>Investigations:</u>

-unine analysis&culture -ultasonography
-ascending cystourethrogram -IVP

Treatment:

1-ttt of ppt factors

2-antibiotic according culture & sensitivity test

3-**long term prophylaxis** by SMX-TMP or nitrofurantoin In small doses for 6 months

N.B ***long term use of nitofurantoin cause peripheral Neuropathy SO giving vit B complex is essential***

Treatment:

1-instructions: **very important**

-↑ fluid intake

-encourage regular voiding

-toilet hygein -----ftont to back i.e.

تقول للام شطفى البنت من قدام الاول وبعدين من ورا واستخدمى ورق مناديل للتنشيف

2-***drugs***:

-analgesic antipyretics-----try to avoid declophenac group(nephrotoxic)

-urinary antiseptics-------uricol eff sachets tds

-**antibiotics :**

Whar type? empirical antibiotic according to age group till c&s test

-Neonates →ampicillin 100mg/kg/day
+ gentamycin 5-7mg/kg/day or amikacin 10-15 mg/kg/d

-Infants→ceforiaxone 50-75mg/kg/day…….of choice
Or cefotaxime 100-150mg/kg/day

-Children→

Nitrofurantoin----**Dose** 6-7mg/kg/day in 2 divided doses
Preparations Uvamin retard cap(100mg)
Macrofuran cap 50&100
Mepafuran cap 50&100

SMX-TMP---- **Dose** 1cm/kg/day in 2 divided doses &½ tab /10kg/day
Preparations septrin susp,sutrim susp

If responding continue ttt otherwise shift to results of c&s test

For how long? For 10-14 day

N.B

1- you can use 3rd generation parentral for 5 days then shift to oral 3rd gen e.g ximacef or orelox

2--aminoglcosides are more potent than 3rd generation Cephlosporine against grame –ve

3- 3rd generation Cephlosporine are more potent than Aminoglcosides against proteus, pseudomonas, Klebseilla

4-ceftazidime is the most potent against pseudomonas

5 -ceftriaxone -----is contraindicated in neonates with Hyperbilirubinaemia

6-smx-tmp------not to be used before 2 months old

7-first generation cephalosporines e.g

Cephadroxil(biodroxil-duricef) 50mg/kg/day every 12 h

Cephalexin 50-100mg/kg/day

They are excreted unchanged in urine so effective in Ttt of uti

8-case of uti not responding to AB therapy suspect Presence of distant septic focus

Acute post streptococcal glomerulonephritis

Aetiology:

Autoimmune disease following urti or skin infection with group A beta Haemolytic streptococci

Skin infection-------common in summer &late autumn
Short incubation period

URTI----------common in winter and early autumn
long incubation period

c/p:

-Haematuria→smoky or cola colored urine
-Hypertesion→usually do not exceed 200/120
-Oliguria→urine oup put <400ml/m"/24h (1-2ml/kg/h)
-Oedema→mild
-Abdominal pain,vomitting
-Pallor

I.X:

1-Urine analysis→
Aspect….turbid
Colour….dark or cola colored
Volume….decreased
Ph…..$\pm$alkaline
RBC casts…..diagnostic

2-Evidence of streptococcal infection→
ASOT….↑(with cases following URTI)
C3……↓
Antihyaluronidase

3-Kindy function test→
Creatinine….↑(norml=,3-1mg/dl)
BUN…..↑ (normal=10-20mg/d i.e urea×2)

4-Serum K→↑(normal= 3,5-5,3 mequ/l)

Ttt:

1-Eradication of streptococci:

Pencillin procaine,oral pencillin or erythromycin for 10 days

2-Oedema:

Fluid restriction

↓ salt in diet

Diuretics……lasix 1-2 mg/kg/day

3-Hypertension:

Mild…….lasix 1-2mg/kg/day

Moderate to severe….vasodilator e.g:

Nifidipine dose----- ,05-,1 mg/kg/day oral or sublinual

Preparations----epilat, adalat(10 & 20 mg/cap)

Captopril dose-----,5-1,5 mg/kg/day(with caution if creatinine↑)

Preparation----capoten,capotril tablet 25&50 mg/tab

Hydralasine dose----,1-,5 mg/kg/dose iv or im ----,25-1 mg/kg/dose orally

Preparations---- apresoline amp 20mg/ml &tablet 25mg

4-TTT of complications:

a -Hypertensive heart failure: the problem is volume over load

So ttt is diuretics→lasix 1-2 mg/kg /day

b-Hypertensive encephalopathy

Clinically:headache

Blurring of vision

Convulsion

Disturbed conscious,semicoma or coma

Treatment:√ nifidedine--,1 mg/kg/dose sublingual

Can be repeated after 10 min

Up to 3 times

(puncture acapsule &instill 5 drop sublingual)

√ Hydralazine--,1-,2mg/kg/dose iv or im

Nitroprusside--,5-2mcg/kg/min contiuous iv infusion

In icu only

Diazoxide---,5-2 mg/kg/dose iv over ½ min

Then hift to usual ttt of htn until controlled

C**-Renal failure:** *usually mild and transient*

1-Oliguria

N.B …. DD of oliguria:

Prerrnal….hypovolaemia

Renal….intrinsic renal disease(e.g GN)

Post renal….obstruction

To differentiate bw different causes:

1-catheter test…. Urine **so its dt postrenal**

..no urine **so its dt renal or prerenal**

2-callenge test to dd bw renal and prerenal

Ringers lactate or saline 20cc/kg over 30 min

Followed by lasix 2mg/kg iv

If no urine….mostly renal

If there is urine….mostly prerenal

a-Volume expanders: Ringers lactate or saline 20cc/kg over 30 min

b-Induction of diuresis: lasix 2mg/kg iv

can be repeated in adose 10 mg/kg iv

c-Fluid restriction: **if** upper measures fail to induce adequate diuresis

equal to insensible water loss+urine output of previous day (usually 300 ml)

Type of fluid…glucose:normal saline in aratio of 1:4

No potassium until adequate urine flow is obtained

2-Hyperkalaemia:

Diagnosis:

A-serum K:

Normal serum K→3,5-5,3meq/L

Hyperkalaemia→> 6meq/L

B-ECG:

-mild hyperkalaemia→prolonged R,tall peaked T wave

-moderate hyperkalaemia→as above+wide QRS comlex

-severe hyperkalaemia→ as above+abscent P

-profound hyperkalaemia→ asystole or ventricular fibrillation

TTT :

1-Calcium gluconate.

Dose----,5 ml/kg **very slowly iv**

Action----antagonise cardiotoxic effect of K

Duration of action----1 hour

2-Sodium bicarbonate

Dose----2 meq/kg(4ml of 5%) over 10-15 min

Action----intracellular shift of K

Duration of action----2 hour

3-Glucose&insulin

Dose----,1 unit for every ,5 gm glucose(=2cm of 20%)

Action----intracellular shift of K

Duration of action----4 hour

4-Salbutamol……Dose ---,1-,3 ml/10kg neubilizer

5- K chelating agents

Dose---- 1gm/kg orally or by high enema

Action ---- remove K from body

Duration of action----2 hour

6-Dialysis-------- if above measures failed

Nephritic syndrome

Def & c/p : the characteristic features of "N.S." are:

1. Heavy proteinuria > 2 gm/24hours
2. hypoalbuminemia&hpoproteinaemia(normal level of prtn 6-8gm%&albumin 4.5-5gm%)
3. edema…..severe generalized
4. hyperlipidemia …… (normal serum 150-250mg%)

Types:

-- Classification of N.S:

1. idiopathic "90% " :

a. minimal change nephrotic syndrome 85%
b. focal segmental glomerulosclerosis 10%
c. mesangial proliferation 5%

2. 2ry to membranous nephropathy, membranous proliferative GN, lupus, Henoch Schonlein purpura, HBV, HCV, HIV…

3. Congenital e.g. Finnish syndrome "AR"

--Histological types:

1. Minimal change nephrotic syndrome: MCNS "85% bet. Age gps 2-6yrs"
2. focal segmental glomerulosclerosis: FSGS "10%"
3. membranous proliferative glomerulonephritis MPGN "5%"
4. membranous

Investigation:

Ist line:

1. Urine analysis and pt. protein creatinine ratio
2. CBC
3. RFT: to know if there is some thing affecting the kidney
4. lipid profile : for confirmation of diagnosis
5. serum albumin

Others; 2nd line:

1. Complements "C3 – C4 ": are usually normal b/c. MCNS is the commonest, if they are abnormal "low level" think for other causes and u may consider renal biopsy.
2. ANA: b/c. there are many c/t diseases that affect the kidney, this is for screening for that.
3. ANCA:

- definitely is not a 1st line
- is not needed until u have a reason
- SLE don't give u +ve ANCA
- SLE gives :
  - +ve Anti dsDNA
  - +ve antiphospholipid Ab
  - +ve ANA
  - ANCA: +ve in case of Wegener and poly arteritis nodosum PAN which is usually rare

4. LFT: generally is not needed, but some time can be valid b/c. there is a certain type of N.S. like MPGN could be related to hepatitis
5. Renal biopsy: is not need as 1st line
6. US. : Really will not tell any thing a part from enlarge, echogenic kidney which is really not specific and not help toward the diagnosis.

Treatment of N.S.

A-SUPPORTIVE TTT:

1-**reasons for admission**:

- -first episode
- -severe generalized edema(anasarca) while simple edema e.g. puffy face in every morning does need for admission
- -presence of severe infection,electrolyte disturbanceor hypertension
- -acute renal failure
- -Serum albumin <2 g/dl: which result in sever edema, so will not response to simple diuretic .so, we need infusion of albumin so, pt. has to be admitted.

2-activity: no restriction of activity except e anasarca or R.D

3-Diet: salt restriction & high protein diet

4- Any associated condition u have to care of it e.g. infection treated with antibiotic

B-DIFINTIVE TTT:

1-heavy proteiurea without massive edema→ corticosteroid only:

prednisolone→2mg/kg/day in single or in two divided doses
for 8 weeks
→ 1.5 mg/kg/day single morning doses every other day for 8 weeks
→ 1 mg/kg/day single morning doses every other day for 8 weeks
→ ,5 mg/kg/day single morning doses every other day for 8 weeks

2-heavy proteiurea with moderate edema→

diuretics→lasix 2mg/kg/day
then corticosteroids

3- heavy proteiurea with massive edema→

Salt free albumin→5ml/kg over 2 hours IV (albumin 20% solution)
diuretics→lasix 2mg/kg/day **IV** (otherwise volume over load will occur)
then shift to oral diuretics &C.S.T

4-frequent relapse → Cyclophosphamide 2-3mg/kg/day single dose for 8 weeks
Main S/E is bone marrow suppression, lead to
neutropenia (quickly develop) + hge cystitis, although thedose is very low in compare to that used forchemotherapy. So, u need to check WBC / wk initially for 3-4wks if its stay well, then u can stop checking or check it every other wk or less freq. U have to use steroid daily or every other day, when he get remission tapering the Dose

Indication of renal biopsy:

1. Freq. relapse N.S.
2. no response to treatment
3. Steroid dependant N.S.
4. Steroid resistance N.S.
5. Others e.g. age <2yrsor >10 yrs, associated hypotension or renal dysfunction.

Nocturnal enuresis

Bedwetting and daytime wetting

Nocturnal enuresis refers to wetting whilst asleep. It usually occurs in normal children and is due to a delay in the development of the normal sphincter control mechanisms. Day and night wetting (diurnal enuresis) may be due to poor bladder sensation or bladder muscle instability. Secondary enuresis refers to wetting in a child who had previously been dry, and is often associated with psychological stress



<u>It is</u>→ repeated involuntary voiding at night beyond the expected age for bladder control

Which is usually 5 years

<u>Management</u>

<u>**A**-evaluation of condition</u>

1-type→

1-primary it's continuation of the involuntary control in the earlier years I.e the child has **never** Attained bladder control

الولد من ساعة اما اتولد لغايه دلوقت لسه بيعملها على نفسه بالليل

It represents 80% of cases

+ve family history usually present

2-secondary it's the involuntary voiding in previously trained child I.e the child has Attained bladder control **for at least 6 months**

الولد كان بيعرف بيمسك نفسه (لمده قد ليه؟) وبعدين بدأ يعملهاعلى نفسه بالليل تانى

2-time→

1- nocturnal its night time incontinence(bed wetting)

2- diurnal its both day time & night time incontinence(continuous wetting)

3-

Common causes of diurnal enuresis:

Pediatric unstable bladder (uninhibited bladder)→mot common cause
Cystitis
Ectopic ureter and fistula
Sphincter abnormality (epispadias, exstrophy;urogenital sinus abnormalities)
Neurogenic

3-associated clinical manifestations:

-in primary type→search for mental retardation ,sacral anomalies(spinabifida,meningoc Urological anomalies

-in secondary type→search for UTI , polyuria ,emotional stress

B-investigations→

-urine anlysis..

..to excude UTI & crystaluria

...specific gravity or osmolality, or both, to exclude polyuria as a cause of incontinence and to ascertain that the concentrating ability is normal.

...The absence of glycosuria should be confirmed.

-ultrasonography with or without a voiding cystourethrogram…to exclude urological anomalis

-urodynamic studes

-x ray on sacral spines….. to exclude spina bifida

c-treatment→

- in every case ttt of any organic cause must be done first e.g UTI

| > 5 years | no treatment(till this age the condition is considered physiological) |

| 5-6 years | non pharmacological therapy i.e **simple instructions** → |

1-fluid intake should be restricted 3 hours perior to bed time
2-child should void before going to bed
3-child should be awakened 4 hours after he goes to bed to have him void
4-easy access to bathroom and privacy in bathroom
5-motivational counseling:

-reassurance of child & parent(explain that the condition is self limited)

-avoid punitive measures (very important) →i.e

No blaming or punishment as it aggrevates the condition

On contrary praise & reward the child for dry nights

6-**<u>bladder training exercises</u>**→help to stretch bladder &↑its capacity

-bladder stretching by holding urine as long as possible **during daytime**

-increase fluid intake **by daytime**

-stream interruption as much as possible **during voiding**

> 6 years as above +pharmacological therap

<u>Drugs for nocturnal enuresis</u>:

1-anticholinergics

Mechanism:spasmolytic action on bladder musculature leading to ↑ bladder capacity

Dose……… 5-10 mg/kg/day single dose at bed time

Preparations……uripan & detronin tab→5mg/tab syrup→5mg/5ml

N.B →**Bellacid tab belongs to this group e good results**

Exclusion of UTI must be done first otherwise urinary retention may occur

2-tricyclic antidepressant

Mechanism:have acentral &peripheral anticholinergic effect also it may ↑secretion of ADH

Dose….

- < 6 years: Not established
- 6-12 years: 10-25 mg PO hs; if response inadequate after 1 wk of therapy, increase by 25 mg/d PO; not to exceed 2.5 mg/kg/d or 50 mg/dos
- > 12 years: Not to exceed 75 mg/dose

if no response after 1 month stop drug and shift to other line

if favorable response continue on same dose for another 2 months then gradual tapering

preparations…..tofranil tab 25mg/tab

3-desmopressin

Mechanism:synthetic analogue of antidiuretic hormone(ADH)

Preparations:minirin ….nasal (100 mcg/mL rhinal tube) ….PO (0.1- and 0.2-mg tab)

Dose :If no response within 2 weeks increase dose to 20mcg/dayPo 0.05-0.2 mg/d Po at bed time

Dermatology

Dermatology

A-PTERIASIS ALBA (patchy hypochromia)

Causes →parasitic investation
→vitamin defeciency

Treatment→

1-ttt of parasitic investation(see GIT DRUGS)

2-vitamin supplementation→

Multivitamins

- **Drops** (for younger infants)
  - **Preparations** →enfavit, bebe vit, polyvit drops
  - **Dose**(for younger infants)→
    - < 6months ….no need for vit supplementation
    - 6months-1 year…….قطارة مره واحده يوميا
    - >1 year ....قطاره مرتين يوميا
- **Syrup**(for older children)
  - **preparations**→totavit, vitam, alvital, multisanostol, KG ron,fruital syrup
  - **Dose**→5-10ml/day
- **chewable tablets**
  - **Preparations**→centrum, chewa-vit, juniors, U.B chewable tab
  - **Dose**→1-2 tab/day

3-topical corticosteroids:

Perderm 1% , diprosone, locacorten vioform cream
مرتين يوميا مع تجنب لمس العين

B-INFNTIL ECZEMA

C/p→ redness ,mild swelling on cheeks&chin
on &off قد تختفى وتظهر بعد فتره
Common in الخريف والربيع

TTT→ perderm cream
twice daily until disappear
never to get in contact with eye

C-URTICARIA

Causes→ ingestant(diet)
inhalant(pollens)
injectant(drugs)
contactant(الصابون-الملابس المصنوعه من الالياف الصناعيه)

C/p→wheel

TTT→

A-antihistamines

1- First generation

<u>**→fenistil drops**</u>

1-2drop/kg/day
safe from first day of life(cause sedation)

<u>**→others**</u>...tavagyl , primaln , phenergan , allergyl ,allergyx syrup

2- second generation

a-low sedating

<u>**→citrizine suiphate**</u>

Preparation……cetrak syrup& tab
zyretic , histazine 1 syrup &drops

→can be used from 6 months ongoing

Dose…….. < 1year 2.5ml/day single dose at night
> 1 year 5ml/day single dose at night

b-non sedating

<u>**→loratidine**</u>

→can be used after 1 year

Preparations------loratan , mosedine , claritine syrup

Dose--------------- 1-2 years 2.5 ml/day & > 2 years 5 ml/day

<u>**→ desloratidine**</u>

-desa , deslorat syrup

<u>**→evastine**</u>

→can be used after 2

B- Soothing agents

Pan-d , bringo , rash stop , roni derm , no rash , hi derm
كل الجسم ماعدا الوجه

C-corticosteroids-----in severe cases only

Perderm cream twice daily....... never to get in contact with eye

N.B

Popular urticaria

Cause→allergic reaction to insect bite

C/p→on extremities &face(area exposed to insect bites)

TTT→antihistamines + perderm cream

Napkin dermatitis

it inflammation and erythema of diaper area

Types→

1-contact napkin dermatitis…..d.t prolonged contact with urine and stool or soap

No involvement of groin creases

2-monilial napkin dermatitis…..d.t supperadded cadidial infection

Groin creases are involved

TTT→

ممنوع استخدام الصابون فى تشطيف العيل

بعد اما تشطفى الولد يترك منطقه الحفاظه مكشوفه لمده10 دقائق

ممنوع تسيبى العيل مبلول(يعنى عاملها على نفسه) لفتره طويل

الدهان يكون بعد كل حمام و عند تغير الحفاضه

1-**mild cases**……preparations containing **zinc oxide** e.g

Zinc olive lotion,cream

o-z cream , three z cream

no rash , rash stop cream , **camo cream** (75 gm)

2-**moderate case&severe cases**…..combined preparations of **CST+antifungal** e.g

Daktacort cream , Nystaform cream

Miconaz-H cream , nice-baby cream

they are used for **5 days** then one of the **following preparations is used:**

miconaz cream

daktarin cream , **pevaryl** cream

causes of fever with rash

<u>V</u>ery <u>S</u>ick <u>P</u>eople <u>M</u>ust <u>T</u>ake <u>E</u>ase

1-varicella(chickenpox)

Fever→it start with rash. Fever can be mild or high and remain for 2-3 days

rash→it start in 1st or 2nd day

characters of rash→ centripetal….appear on trunk and fadestowards face&extremities
pleomorphic….different types of rash are present at same time
e.g vesicles, papules, pustules
successive croups
pruritic

TTT→ **example:**

1-antihistanime fenistil drops 1 drop/kg at night

2-soothing agents pan-d , bringo , rash stop, Hiderm lotion دهان لكل الجسم ماعدا الوجه

3-antipyretic brufen syrup wt/2 every 8 hour

4-no AB الولد يستحمى كل يوم

2-scarlet fever

fever→it reaches 39-40 c on 2nd day and return to normal over next 5 days(earlier e AB therapy)
may be associated with vomiting and abdominal pain

rash→it appears on 1st or 2nd day soon become generalized,
it appears as fine paular rash(sand paper or gooseflesh).
face appears flushed e circum oral pallor
it remains for 3-5 days and fades with branny desquamation

characteristic features→ pharyngitis and strawberry tongue(white then red strawberry tongue)

ttt→

-antibiotic….erythromycin
Amoxicillin
Amoxicillin clavulinic acid

-antipyretic…..cetal supp or brufen syrup

نبه على الام انها اخد بالها من اى تغيير فى لون البول؟(for fear of PSGN)

3- plague…..???

4-measles

fever→it rises gradually during first 4 days to reach 40c with appearance of rash,
then after 2 days it decline to norml

it is associated with **severe cattarhal** manifestations(rhinitis,**<u>cough</u>**,conjuncitivitis)

rash→it appears in the 4th day first behind ear then become generalized

it fades over next 3 days ,it remain for 6 days

characteristic features→koplik's spots(as sand grains opposite the lower molar teeth)

TTT→

-antipyretics….paracetamol or ibuprofen

-nasal decongestants &eye drops…………nostmine N/E drops

<u>5-typhoid</u>…..see typhoid fever micellenous topics

<u>6-erysipelas</u>

N.B

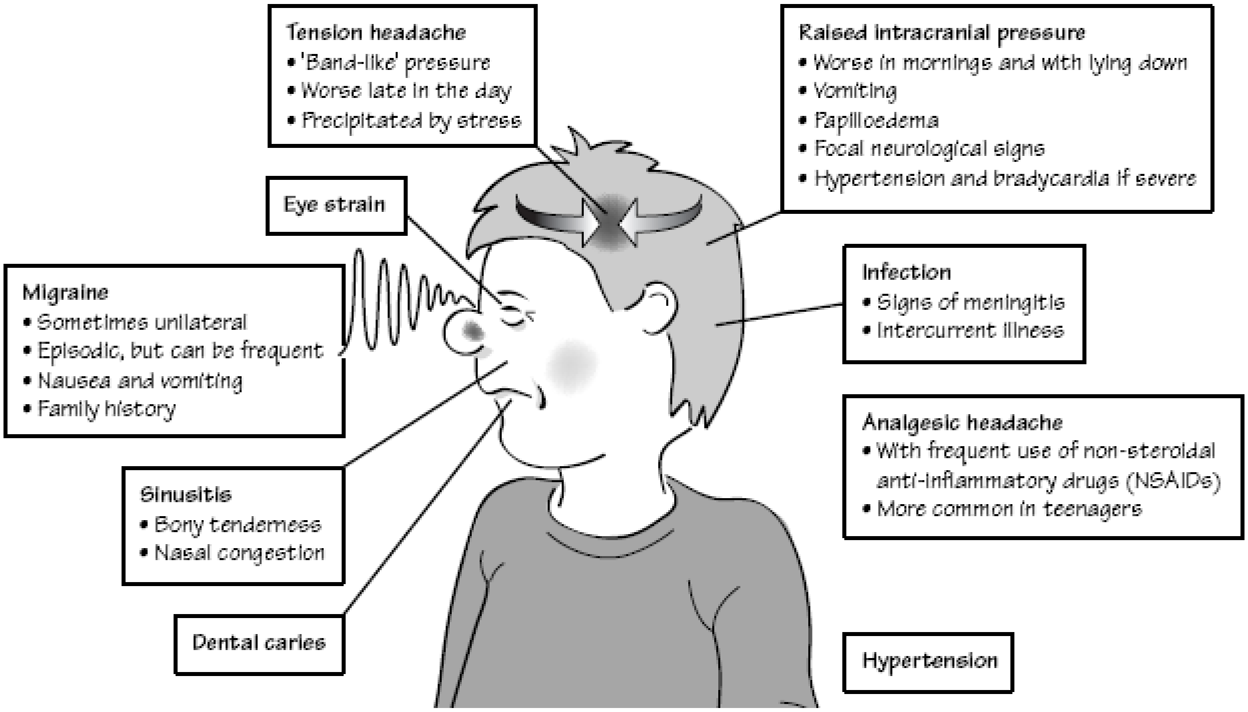
Roseola infantum(Exanthem sabitum)

fever→it rises rapidly to 39.5-41c and remain for 3-4 days

rash→it appear in 4th day **<u>with the drop of fever</u>** &remain for 24 h

Other topics

HEADACHE



What you need from your evaluation

History

- Is there a family history of migraine? Migraine often tends to be familial
- Obtain a good description of the headaches. Are they unilateral or bilateral? Tension headaches are described as a tight band around the head. Pain in the frontal bones may suggest sinusitis. Migraine is classically throbbing
- Are there associated symptoms? Ask about vomiting and blurred vision, which may be features of raised ICP
- A headache that is worse in the morning or when lying down suggests raised ICP
- Visual auras, such as halos or zigzag lines, are suggestive of migraine
- Photophobia and neck stiffness in addition to headache would suggest meningitis, although they can occur in non-specific viral infections
- Ask about nasal congestion and pain in the teeth or ears as infection around the skull can present as headache

Examination

- Record the blood pressure
  Feel the pulse: is there a relative bradycardia?
- Examine the fundi: look for signs of papilloedema
- Are there any focal neurological signs?

-cerebellar:	nystagmus, ataxia, intention tremor
-infratentorial:	cranial nerve palsies
-cerebral:	focal seizures, spasticity
-pituitary:	endocrine dysfunction, visual field defects

- Look for evidence of dental caries, sinus tenderness, audible cranial bruits (suggests arteriovenous malformation)

Investigations and their significance

- CT or MRI brain scan — Indicated if signs of raised ICP or any focal neurological signs, or if headache is persisting and not responding to normal

N.B

the main priority is to rule out diagnostic possibilities that may be life-threatening:

- Malignant hypertension
- Increased intracranial pressure (e.g., mass lesion, acute hydrocephalus)
- Intracranial infections (e.g., meningitis, encephalitis)
- Subarachnoid hemorrhage
- Stroke
- Acute angle closure glaucoma (may appear as a headache, but rare in chiAbnormal neurologic signs

N.B

When should neuroimaging be considered in a child with headache?

- Headache increasing in frequency and severity
- Headache occurring in early morning or awakening child from sleep
- Headache made worse by straining or by sneezing or coughing (may be a sign of increased ICP)
- Headache associated with severe vomiting without nausea
- Headache worsened or helped significantly by a change in position
- Fall off in linear growth rate
- Recent school failure or significant behavioral changes
- New-onset seizures, especially if seizure has a focal onset (*see* previous discussion)
- Migraine headache and seizure occurring in the same episode, with vascular symptoms preceding the seizure (20-50% risk of tumor or arteriovenous malformation)
- Cluster headaches in any child or teenager

N.B **CLASSIC HEADACHE OF INCREASED INTRACRANIAL PRESSURE**

1. Awakens patient from sleep at night
2. Pain present upon awakening in the morning
3. Vomiting without associated nausea
4. Made worse by straining, sneezing, or coughing
5. Intensity of pain changes with changes in body position Pain lessens during the day

Typhoid fever(enteric fever)

etiology→salmonella typhi
incubation period→ 1-3 weeks
c/p→
-in young infants
- ranges from mild GE to severe fulminant septicemia without diarrhea
-Fevere anorexia lethargy weight loss hepatomegally
-in older children (it resembles adult typhoid)
-begins e high fever,headache,malaise,myalgia,anorexia,vomiting,± chilly sensation
-diarrhea in early stage in <50% of patients,but constipation is noted in later stages
-realative bradycardia despite high tempreture
-cough is often present
-abdominal distension&tenderness
-palpation of abdomin: spleen is mildly enlarged,softand tender
Doughy sensation+gurgling when cecum is palpated
-macular(rose spots)or maculopapular rash may appear on chest&trunk on 5^{th} day of illness
-convulsion may occur
-by the end of frist week,the child may be very sick with confusion, delirium, and stupor

I.X. →
-CBC→relative leucopenia early in the disease
-blood culture→positive during 1^{st} week
-stool,urine&bone marrow culture→positive during 2^{nd}&3^{rd} week
-**widal test**→
Widal test measures antibodies against O and H antigens of *S.* Typhi but lacks sensitivity and specificity in endemic areas.
Because **many false-positive and false-negative** results occur, diagnosis of typhoid fever by Widal test **alone is prone to error**

-usually positive during 2^{nd}&3^{rd} week
-high titer of 0 (**≥ 4 folds normal ie 1/360**) → suggest the presence of active infection
-high titer of H →suggest past infection or past immunization
False negative→ early in the disease(during 1^{st} week)
Early ttt with proper antibiotics(may suppress antibody formation)
False positive→ previous TAB vaccination(high 0 +high H)
Anamnestic reaction(non specific agglutination e other non slamonellal antibodies)

TTT→

-general supportive:

Antipyretics

Soft diet&liquids

Adequate fluid&electrolyte balance

-antibiotics:

-Oral…

Fluoroquinolones ? only > 18 year old

oral 3rd generation cephalosporine (the best oral therapy)

-oral 3rd generation			
1-cefixime	8 mg/kg/day single dose or **in 2 divided doses** √√	Ximacef &suprax ……Susp 100mg/5ml ……cap 200mg/cap	Not antistaph Not antipseudomonal
2-cefpodoxime	1o mg/kg/day in 2 divided doses	Orelox susp 40mg/5ml Tab 100mg	Used mainly in ttt of Uti , typhoid fever,OM & sinusitis

amoxicillin 100g/kg/day in 4 divided doses(high relapse rate)

chloramphincol 50-100 mg/kg/day oral or iv

SMX-TMP 1cm/kg/day in 2 doses

Azithromycin 10g/kg on day 1, followed by 5 mg/kg for 7 days

-Parentral…..

3rd generation cephalosporine

Cefotaxime 100-150mg/kg/day in divided doses

Ceftriaxone 50-75 mg/kg/day single daily dose

Ceftazidime 100-150 mg/kg/day in 2 divided doses

	OPTIMAL THERAPY			ALTERNATIVE EFFECTIVE DRUGS		
SUSCEPTIBILITY	**Antibiotic**	**Daily Dose (mg/kg/day)**	**Days**	**Antibiotic**	**Daily Dose (mg/kg/day)**	**Days**
UNCOMPLICATED TYPHOID FEVER						
Fully sensitive	Chloramphenicol	50–75	14–21	Fluoroquinolone, e.g., ofloxacin or ciprofloxacin	15	5–7
	Amoxicillin	75–100	14			
Multidrug resistant	Fluoroquinolone or cefixime	15	5–7	Azithromycin	8–10	7
		15–20	7–14	Cefixime	15–20	7–14
Quinolone resistant[†]	Azithromycin or ceftriaxone	8–10	7	Cefixime	20	7–14
		75	10–14			
SEVERE TYPHOID FEVER						
Fully sensitive	Ampicillin or ceftriaxone	100	14	Fluoroquinolone, e.g., ofloxacin or ciprofloxacin	15	10–14
		60–75	10–14			
Multidrug resistant	Fluoroquinolone	15	10–14	Ceftriaxone or cefotaxime	60	10–14
					80	
Quinolone resistant	Ceftriaxone	60–75	10–14	Fluoroquinolone	20–30	14

Ricket

It is rickets?

<u>1-skeletal mainfestations</u>→most important diagnostic feature√√

-head…...large head, frontal bossing, delayed closure of fontanel, delayed teething

-thorax.…rosary beads(enlarged costocondral junction)

Harisson sulcus(longitudinal groove at lower costal margin)

Longitudinal sulcus(vertical groove behind rosary beads)

$\pm$ chest deformity

-limbs…..broad epiphysis at lower end of ulna&radius

Marfan sign(transverse groove palpated over the medial malleoli)

$\pm$ limb deformity

-spine…….correctable kyphosi

<u>2-muscular mainfestations</u>:

-delayed motor development(delayed sitting , crawling , standing , walking)

-abdominal distension

-viscerotois(palpable liver &spleen)

<u>3-neurological Mainfestation</u>:

-anorexia ,irritability , sweating

-tetany

what is the cause?

Causes of rickets:

a-nutritional most common(**vit D ↓rickets**)

<u>due to</u>…..defective intake or synthesis of VIT D e.g:

-prolonged breast feeding or fresh cow milk with out VIT D supplementation e food rich in VIT D

-lack of exposure to sun rays

<u>Clinically</u>….usually between 6 months-2years &dietitic error is ujually evident

<u>Laboratory</u>…. Normal serum Calcium , low phosphate , high alkaline phosphatase

<u>Threapeutically</u>… there is good response to ujual dose of VIT D . such response can be denomestrated radiologically after 2-3 weeks of intiation of therapy

b- non nutritional rickets(VIT D resistant)

due to……defective absorption (malabsorption $,celiac disease ,steatorrhea)
defective activation (renal rickets &hepatic rickets)

clinically….usually after 2years OR before 6 months

theraputically……do not respond to usual dose of VIT D

conclusion

→radiological signs of healing in nutriyional rickets start **after 2 weeks** of onset of VIT D therapy(healing rickets)&become completed after 4weeks(healed rickets) failure to respond to VIT D after 4 weeks **should suggest** VIT D resistant rickets and some investigations are necessary to identify the causitive disease

I.X.→ 1-serum Calcium , phosphate , alkaline phosphatase
2-acid base balance (to detect metabolic acidosis)
3-evaluation of renal function

Its active or not?

1-radiological → plain X ray on wrist (better on **knee** Bone growth is most rapid in this area, and rachitic changes are seen earliest at this location.) will show signs of activity:

- Cupping, fraying, and irregularity of the metaphyses
- Widening of the physis as a result of increased osteoid
- Loss or increased separation of the zone of provisional calcification
- Periosteal reaction (appears to separate from diaphysis as a result of increased osteoid)
- Coarsening of trabeculae
- Loss of bone density
- Bowing of long bone

2-clinically→

Presence of skeletal mainfestation do not mean that it is active rickets, but presence of Hypotonia (muscular mainfestatoin) or tetany(neurological mainfestation) are signs Of activity

1-history of motor development →delayed motor development indicate activity

2-history of VIT D intake→absent intake favour activity

3-presence of latent tetany

What is the Treatment ?

1-correction of dietitc error……..diet rich in VIT D e.g… صفار البيض-السمك-البطاطس المسلوقه-الزبادى

2-exposure to ultraviolet sunrays تكشفى جسم الولد وتسبيه يلعب فى الشمس من 8-9صباحا ومن 4-5عصرا

3-drugs→

a-VIT D

Dose………prophlyaxsis 400 iu/day
Treatment 2000-3000 iu day

Preparations……drops→ vidrops 100 iu/drop
syrup→decal B_{12} , calci-cal , vitacal
(each 5ml=1000IU VITD+50mg Ca +10 mcg VIT B_{12})

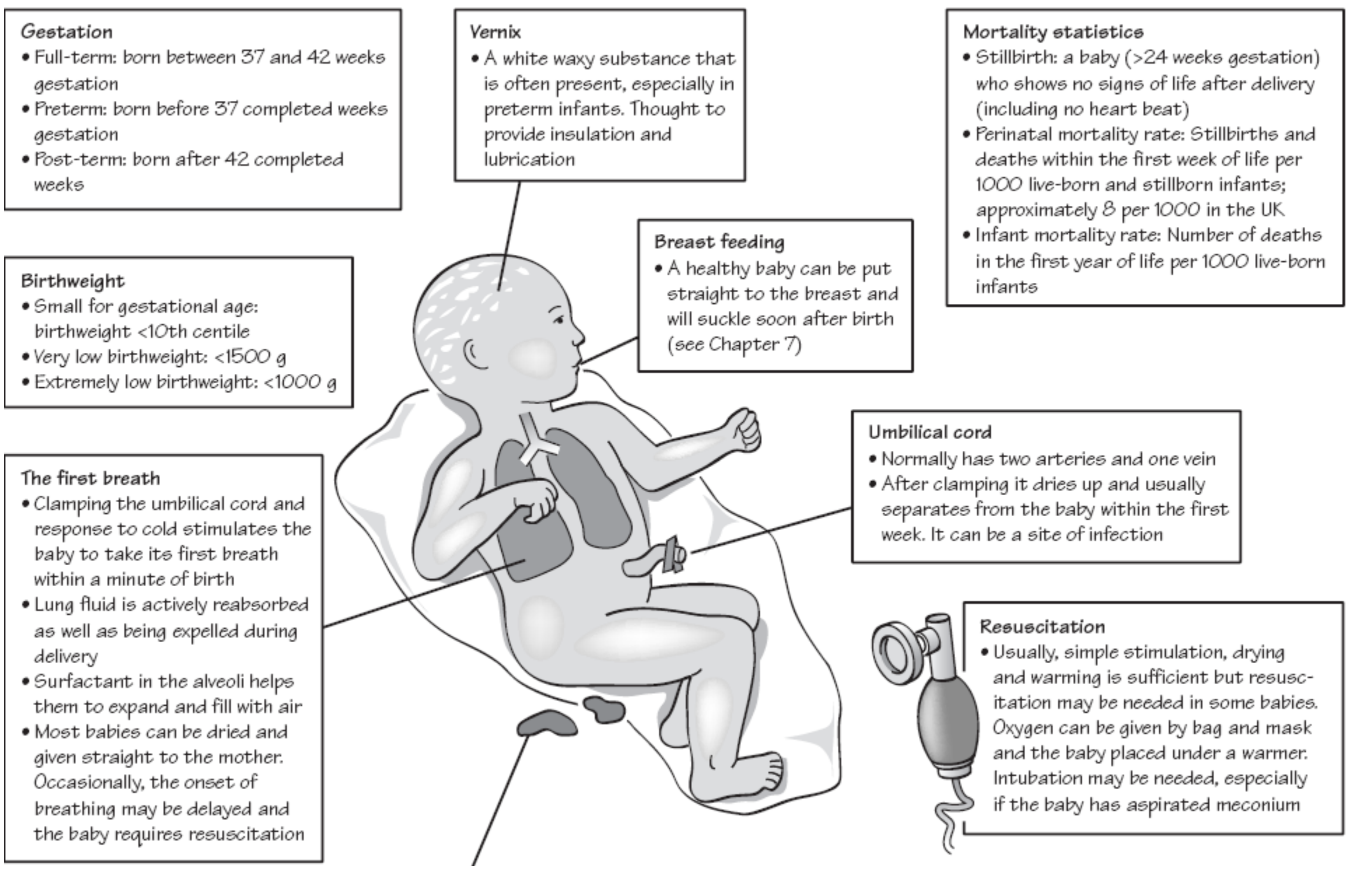
b-Calcium(only in severe cases not in mild to moderate cases**)**

Dose………40mg elemental Ca/kg/day

Peparation…..Hical (78 mg elemental Ca/5ml)
Cal-D-B_{12} OR CAlcid B_{12}(50mg elemental Ca /5ml)
Calcium Sandoz (110 mg elemental Ca /5ml)

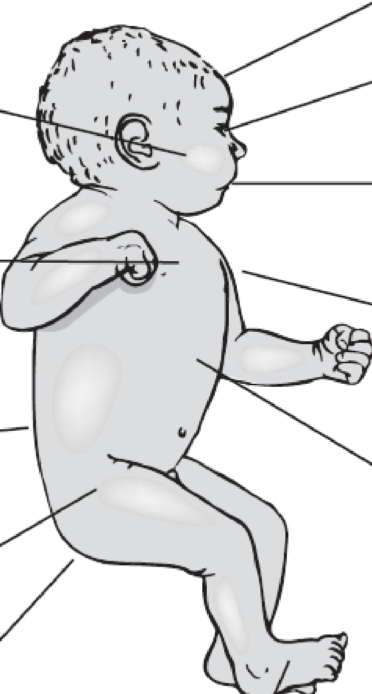
N.B Roughly
vidrops 10 drop tds
Hical 5ml/day or every other day

Neonatology



Neonatal Examination

All newborn babies are carefully examined in the first 24 h of life to check that they are healthy and to detect congenital abnormalities, some of which may not be obvious to the parents. The baby should be fully undressed in a warm room and examined from head to toe. Ask the mother if she has any concerns and whether there is any family history of note, for example of deafness or congenital dislocation of the hips



General observation
- Weight, length and head circumference
- Maturity
- Muscle tone
- Reflexes: Moro, grasp, suck and rooting
- Is this a healthy baby who is feeding well?

Skin
- Pallor
- Jaundice
- Cyanosis
- Rashes (erythema toxicum is normal)
- Birthmarks (see p. 88)

Head
- Anterior fontanelle
- Cephalhaematoma (parietal swelling that does not cross suture lines)
- Chignon from Ventouse suction cup

Face—dysmorphic features?
- Low set or simple ears
- Inner epicanthic folds
- Mongolian or anti-Mongolian slant of eyes
- Symmetry of face and mouth
- Accessory auricles and pre-auricular pits
- Micrognathia (small chin)

Eyes
- Red reflex (to exclude cataract)
- Jaundiced sclera
- Colobomata (defect in the pupil)

Mouth
- Cleft lip/palate
- Central cyanosis
- Neonatal teeth

Heart
- Cyanosis
- Heart failure (tachypnoea, hepatomegaly)
- Heart murmur
- Femoral pulses (coarctation)
- Apex beat (dextrocardia)

Chest
- Respiratory rate
- Respiratory distress
- Symmetry of chest movement (pneumothorax, diaphragmatic hernia)

Back and spine
- Spina bifida or posterior encephalocele
- Midline naevus, lipoma or deep sacral pit can suggest an underlying spinal abnormality

Abdomen
- Abdominal distension or bile-stained vomiting suggest bowel obstruction (e.g. atresia)
- Palpable kidneys (hydronephrosis)
- Anterior abdominal wall defects (gastroschisis or exomphalos)
- Three vessels in umbilical cord? (normal)

Hips
- Barlow and Ortolani tests for congenital dislocation of the hips (CDH)
- Ask about risk factors (breech, family history of CDH)

Genitalia and anus
- Hypospadias (urinary meatus on underside of penis)
- Cryptorchidism (undescended testes)
- Ambiguous genitalia: if both testes are impalpable, consider whether the baby could be a virilized female, due to congenital adrenal hypoplasia
- Imperforate anus (may have fistula to bladder or vagina)

Limbs
- Talipes equinovarus (club foot)
- Polydactyly (extra digits or toes)
- Syndactyly (fused digits or toes)
- Single palmar crease and 'sandal gap' between toes (Down syndrome)
- Contractures (oligohydramnios or congenital muscular disorder)
- Absent radii (VACTERL association)

Common syndromes to be aware of:
- Trisomy 21 (Down syndrome)
- Trisomy 13 (Patau syndrome)
- Trisomy 18 (Edward syndrome)
- Turner syndrome (45 XO)
- Noonan syndrome (lymphoedema)
- VATER and VACTERL association
- Pierre-Robin sequence

Neonatology resuscitation

See text

N.B

oxygen therapy:

Indications

1-during neonatal resuscitation
2-any patient with respiratory distress is in need to oyggen
3-cyanosis(cardiac or respiratory) with RD is an urgent indication of 02
4-hypoxia with pa02 <50 torr
5-neonatal apnea
6-acute severe brain insult,coma,and seizures

Method of giving 02:

1-enriching the incubator atmosphere
2-oxygen hood(**head box** ,oxyhood)
3-the ordinary **face mask**
4-**nasal cannula**
5-**nasal prongs**
6-**nasopharyngeal mask**
7-**endotracheal tube**

Respiratory distress

See text

-Respiratory problems are the commonest cause of serious neonatal illnee&death
-Respiratory distressusually presents as acombination of grunting,tachypnea,nasal flaring,Sternal&intercostal retraction±cyanosis

Causes of respiratory distress

A-Respiratory causes:
-Respiratory distress $(RDS)
-Transiet tachypnea of newborn(TTN)
-Air leak(pneumothorax)
-Chronic lung disease(bronchopulmonary dysplasia)
-Airway obstruction(bilateral choanal atresia)
-Muconium aspiration $
-Neonatal pneumonia

B-Cardiac causes:
-Heart failure(HF)
-Persistant fetal circulation(PFC)
-Persistant pulmonary hypertension(PPHT)
-PDA

C-Central causes:
-Hypoxic ischaemic encephalopathy
-Intracranial haemorrhage
-Meningitis

D-Haematological
-Severe anaemia or polycythemia

E-Other
-Sepsis ,metabolic acidosis ,overheating ,hypoglycemia

DD of RD

See text

1-Respiratory distress $
Etiology→surfactant deficiency
Those at risk are:
1-prematurity(immaturity of the lung)
2-maternal diabetes
3-cessarain section delivery
4-multiple pregnancy
5-perinatal asphyxia

Diagnosis→see text

Tranient tachypnea of the newborn(TTN)

ETtology→

delayed clearance of fetal lung fluid(hence the name **wet lung disease)**

those at risk are:

1-Delivery by elective CS

2-Maternal sedation

3-Delayed clamping of cord

4-Premature delivery

Diagnosis→

Onset→respiratory distress appear within few hours after birth(1-3h)

Distress→usually **mild**(tachypnea100 br/min or less ,mild grunting ,few retracrions)

CXR→hyperexpantion of the lung(hallmark of TTN)

Prominent peri-hilar streaking

Fluid in minor fissure

Prominent pulmonary vascular markings

Magenent→

1-correction of hypoxia……02 byhead box .CPAP may be needed in some infants

2-chest physiotherapy…How?Tapping on chest(front, back ,sides)by mask of ambou

3-**antibiotics….**ampicillin+aminoglycosides I far to start with

4-fluid,electrolytes&feeding…………

-start with IVF then shift to oral feeding according to improvement of respiration

-start IVF with 60ml/kg dextrose 10% in first day

-in second day :give 70ml/kg(NS 13ml/kg/d+Ca 2-5ml/kg/d+restis dextrose 10%)

-start feeding when the RR is < 90 br/min by NG tube &when reach~60 br/min

Oral feeding is intiated

Meconium aspiration $

Etiology&pathophysiology→ -**Meconium is** the first stool of the newborn passes after birth.its greenish black viacid stuff Formed by biles,intestinal secretions & epithelial debrith present in the fetal gut

acute or chronic **fetal hypoxia** stimulates fetal peristalsis and relaxes the anal sphincter leading To passage of meconium in the aminiotic fluid.**also**,this hypoxia leads to **stimulation of fetalRespiration** and hence **aspiration of the meconium** containing aminiotic fluid

The aspirated mecomium leads to:

-chemical irritation and inflammation of the lung(chemical pneumonitis)

-promotion of bacterial growth(pneumonia)

-airway obstruction either:

Partial obstruction(ball valve) →air trapping→over inflation&emphysema;with the possibility Of air leak→(**pneumothorax**)

Complete obstruction→atelectasis

Those at risk are:

Term and post term infants who suffer from placental insufficiency

Diagnosis→

-Greenish discoloration of the **aminiotic fluid,skin,nail&umbilical cord** are very pthognomonic

-RD usually **appears quickly after birth** and may **be severe**

-air trappin cause **lung overdistention**,anterior bowing

On auscultation there are widespread added sounds **with rhonchi and fine or sticky crepititions**

CXR→

-lung looks over-expanded and contain multiple areas of atelactasis

-air leak(pneumothorax,pneumomediastinum)

management→

-try to be **prepared for the condition** (this needs good cooperation between the obstetrician&Neonatologist who should attend the delivery with all the resuscitation equipment)

-suction of the mouth then nose **before** delivery of the shoulder then the baby is wrapped by Preheated towel **to prevent intiation of respiration** and placed on the preheated Warmer

-**tracheal lavage**→through an endotracheal tube put½-1ml saline the do suction repeat again And again till fluid comes clear

(**donot ventilate before** this otherwise you will push Meconium particles more distally)
-02 & ventilator support
-early surfactant therapy may benefit the infant
-antibiotics all infants should receive broad spectrum AB
-intravenous fluids &nutrition before entral feedins

-ttt of comx e.g **pneumothorax**

-**<u>diagnosis</u>**

-clinically

-sudden onset of cyanosis
-increase in respiratory effort or rate
-shift of heart beat
-breath sounds arelouder over one lung
-deterioration of general condition, mottling of skin and sluggish peripheral blood flow
-development of low blood pressure
-episodes of apnea and bradycardia

-Radiologically

AP and lateral view;the jet-black appearance, shift of mediastinum,

-**<u>TTT→</u>**

-butterfly cannula in 2^{nd} intercostals space mid clavicular line connected to under water seal

-OR **chest tube**

Size……….8-10

Site……..…4^{th} space anterior axillary line at upper border of rib below

Neonatal jaundice

See text

definition→yellow discoloration of skin,sclera,&mucos membranes due to increased level bilirubin in blood,jaundice is clinically observed in the newborn infant when the **total** serum bilirubin reaches **5-7 mg/dl** (>2mg/dl in older children) .it first appear in face then descend downward as the level increase

source of bilirubin→

causes of neonatal jaundice→

a-unconjugated hyperbilirubinemia

b-conugated hyperbilirubinemia

A-uncongated hyper bilirubinemia……….1-↑production

2-↓uptake&conjugation

<u>1-↑production :</u>

-hemolytic anemias(RH &ABO incompatibility ,G6PD deficiency, hereditary spherocytosis)

-polycythemia

-excess bruises and hematomas(cephalohematoma, subaponeuritic haemorrhage)

<u>2-↓uptake &conjugation</u>

-physiological jaundice of newborn

-immature liver(especially In the preterm)

-competitive inhibition:breast milk jaundice

-deficient uptake(Gilbert disease)

-hereditary(Crigler-Najjer $)

b-conjugated hyperbilirubinemia:

<u>1-hepatocellular:</u>

hepatitis→A-E,rubella,herpes simplex,toxoplasmosis

bacterial sepsis→

inborn error of metabolism

<u>2-cholestatic:</u>

Biliary atresia

Bile duct stenosis

Bile mucos plug ,choledocal cyst

Physiological jaundice

This is the most common cause of jaundice in newborn.it occur in **about 60%** of full term Newborn infants and more in premature

<u>Causes</u>:

1-↑bilirubin load on liver:

-short live span of fetal RBC
-high RBC mass in newborn
-enterhepatic circulation of bilirubin(Bglucuronidase enzyme present&putrefactive flora absent)

2-↓uptake of bilirubin By the liver(transient immaturity of Z&Y protein)

3-↓conjugation of bilirubin by liver(transient immaturity of glucoronyl transferase enzym)

<u>Above mentioned causesare also applicable in preterm newborn but they are more exaggerated Plus:</u>

-open ductus venosus shunts the blood from the portal vein to the inferior vena cava-thus Bypassing the liver
-hypoglcemia→↓UDPGneeded for conjugation

<u>Manifestations:</u>

1-aundice usually appears **in 2nd or 3rd day(not in first 24 h)**
2-the rise in bilirubin **is less than ,5 mg/dl/h**
3-the peak level of serum bilirubin is **less than** (12 mg/dl in full term &15mg/dl in preterm)
4-jaundice usually **donot** persist **after 5-7 days**
5-the jaundice is of unconjugated type
6-the newborn is **healthy, feeds well**
7-**no anaemia(**normal hemtocrit level)
8-urine and stool are normal

Level under 2mg/dl may not be reached till age of one month

<u>The physiological jaundice may be prolonged in</u>

-**hypothyrodism**→thyroxin is neededfor maturation of enzyms&GIT motility
-**breast milk jaundice** in some exclusively breast fed babies
-pyloric stenosis-delayed passage of stool

Treatment→ see text

N.B **What to do first**

➢Careful history & physical exam to exclude life-threatening problems like sepsis, to identify infants w/ hemolytic disease

▪General measures:

➢Phototherapy

_ First-line treatment
_ Generally begun 4–5 mg/dL below exchange transfusion level (see below)

Clinical pearls

_ Maximize skin surface area exposed to phototherapy (if bilirubin levels high, use fiberoptic pad underneath infant and lights from above)
_ Special blue/tungsten lights most effective (caution: tungsten halide lamps produce a lot of heat, can burn skin if placed too close)
_ Light does not have to be administered continuously; lights can be turned off briefly (for intervals of 15–30 min) w/o losing effectiveness
_ If meter available to measure energy output of phototherapy light, use doses of light >= 10 micro watts/cm^2/nm
_ Dose-response relationship between energy output of light, decrement in serumbilirubin
_ Doses of light up to 30 micro watts/cm^2/nm increasingly effective

_ Risks

_ Increased insensible H_2O loss (minor issue)
_ Increased stooling (rare)
_ Bronze baby syndrome (rare)
_ Overheating/burning (preventable)

➢Exchange transfusion (EXTX)

_ Used when serum bilirubin concentration reaches level that places infant at risk for bilirubin-induced brain injury

▪General guidelines for phototherapy & exchange transfusion

➢Preterminfants

_ Birth wt <1250 g: photorx @ total serum bilirubin (TSB) 5–7,

EXTX @ TSB 10–13

_ Birth wt 1250–1499 g: photorx @ TSB 7–10, EXTX @ TSB 13–16

_ Birthwt 1500–1999 g: photorx@TSB 10–12, EXTX@TSB 16–18

_ Birthwt 2000–2500 g: photorx@TSB 12–14, EXTX@TSB 18–20

note: Preterm infants w/ risk factors for kernicterus should be exchanged at lower part of range; risk factors incl perinatal asphyxia, ongoing hypoxemia, persistent hypothermia, hypoalbuminemia (<2.5 g/dL), hemolysis, sepsis or CNS depression

➢ **Healthy termnewborns**

_ Age <24 h: term infants who become jaundiced in first 24 H of life not considered healthy

_ Age 25–48 h: photorx @ TSB >15, EXTX @ TSB >20, if photorx fails, EXTX + photorx @ TSB >25

_ Age 49–72 h: photorx @ TSB >18, EXTX @ TSB >25, if photorx fails, EXTX + photorx @ TSB >30

_ Age >72 h: photorx @ TSB >20, EXTX @ TSB >25, if photorx fails, EXTX + photorx @ TSB >30

➢ **Sick term newborns or term newborns w/ suspected/proven hemolysis**

_ Age <24 h: photorx @ TSB >10–14, EXTX @ TSB >20

_ Age >= 24 h: photorx @ TSB >15, EXTX @ TSB >20

Neonatal infection

Infections are afrequent cause of neonatal morbidty&mortality

what gives them special importance?

-their presentation is usually vague and may resemble many ther common dieases

-the routine laboratory tests are of no great help in their diagnosis

-the host resistance mechanisms of neoborn are easily over comed by micro-organisms

Classification;

A-Minor infection…….-infection of skin e.g napkin dermatitis

-infection of breast tissue

-infection of conjunctiva(ophthalmia neonatorum

-trush stomatitis

-umbilical infection

B-major infections

1-congenital infections

2-neonatal sepsis syndrome

Neonatal sepsis

Definition…..neonatal sepsis is a clinical(&laboratory)$ caused by the metabolic and hemodynamic Consequences of infection during the **1st month of life**

In most cases the condition is **not localized** and called **"neonatal septicemia"**

in other cases,in addition to its systemic nature of the infection could be **localized** to give for example:pneumonia,meningitis,septic arthritis,uti

the most common organisms:

-E-coli	-group B strepto
-Enterococcus	-proteus&pseudomonas
-listeria monocytosis	-klebsiella

The predisposing factors:

1-maternal….premature rupture of membranes,traumatic or prolonged delivery,maternal uti

2-neonatal….prematurity,endotracheal intubation,umbilical catheterization,mechanical Ventilation

One can distinguish two patterns of neonatal sepsis:

1-early onset…. start usually in the first week

related to obstetric risks,

mainly caused by organisms present in the cervix&vaginal canal

2-late onset….. start usually after the first week,

not related to obstetric risks,

mainly caused by more virulent organisms as staph ,pseudomonas

Diagnosis

History ……of risk facors

Early manifestations……

usually vague and non specific

the baby is not doing well or sick(poor suckling,lethargy,vomiting,fever or hypothemia)

Late manifestation…..

usually related to different systems

serious focal infections e.g meningitis,pneumonia,uti,NEC,septicarthritis,DIC…etc

Laboratory……

triple tap { blood+CSF+urine } for laboratory work

laboratory evidence of infection

-cultures : blood,CSF,urine

-antigen detection: CSF,urine

laboratory evidence of inflammation

-**total white cell** count below 5000/mm' or above 30000/mm'

-**CRP** above 20mg/liter

-band cell above 10%

-**ESR** above 15 mm/first hour

Laboratory evidence of multi-system organ disease

-metabolic acidosis(pco2,pH)

-renal function(**BUN,creat**)

-liver function(SGOT,SGPT)

-bone marrow(**anemia**,neutropenia)

Treatment….

1-**Specific ttt**

a-Antibiotics start immediately,**modify** after the results of culture&sensitivity test

Srart with ampicillin +gentamycin or amikin or tobramycin or cefotaxime

Duration 2weeks **minimally** ,3weeks with **meningitis**, 4weeks with **septic arthritis**

b-Gammaglobulin….,2gm/kg iv for

2-**Supportive ttt**…maintain good fluid&electrolyte balance

Ventilator support

Blood transfusion

or even **exchange transfusion** single volume transfusion (wt x 80)